BSM-8301A	MU-831RA
BSM-8301J	MU-831RJ
BSM-8301K	MU-831RK
BSM-8302A	MU-832RA
BSM-8302J	MU-832RJ
BSM-8302K	MU-832RK
	AC-800PA
	AC-800PJ
	AP-800PA
	AW-800PA
	AH-800PA
	AE-800PA
	AR-800PA
	AL-800PA
	AG-800PA
	AG-820PA

Life Scope 9
BEDSIDE MONITOR
BSM-8301/8302

0634-000059F

0634-000059F

MANUAL CHANGE INFORMATION

DATE: January 22, 1999

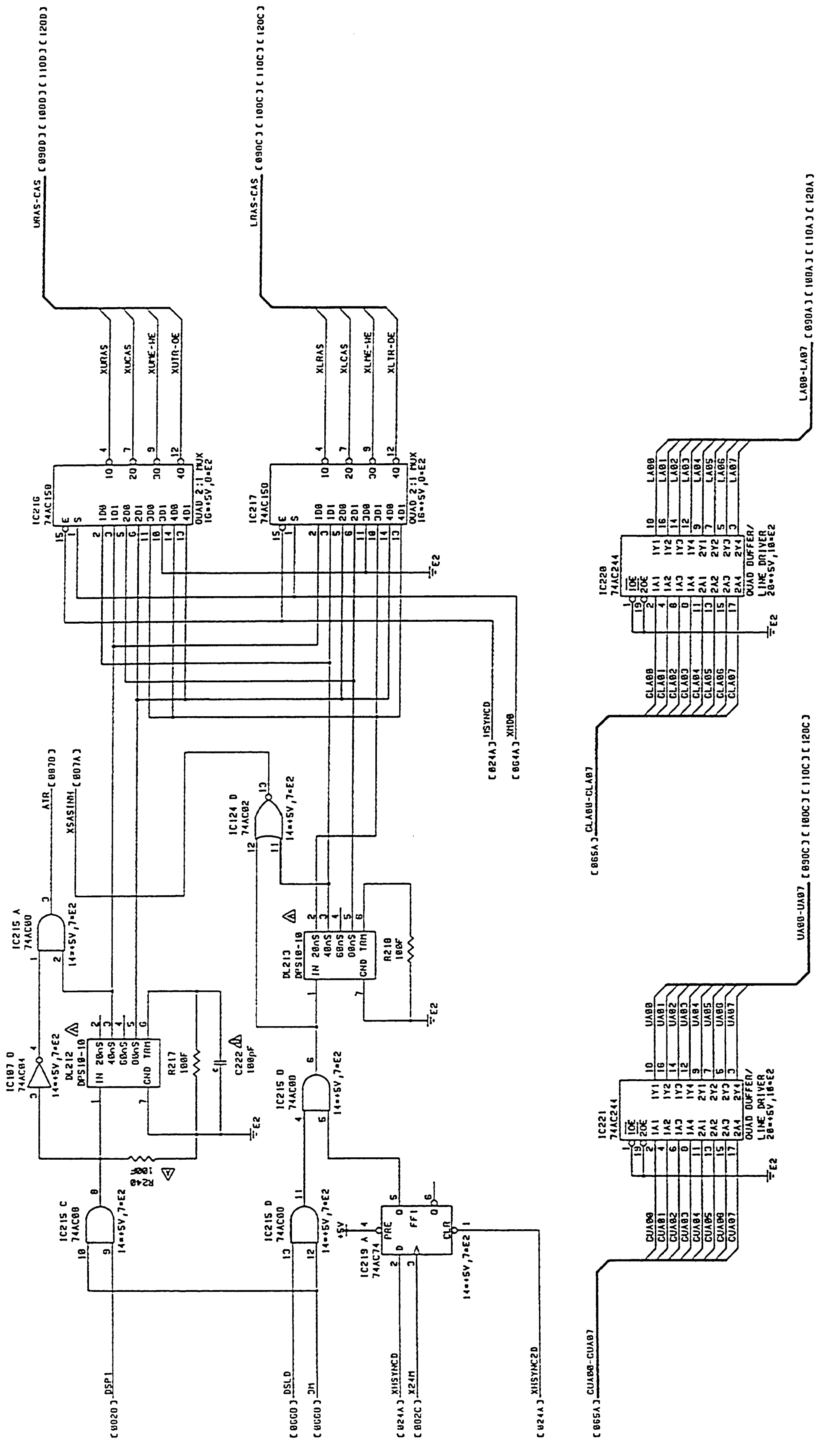
Circuit Diagram Change

The circuit diagram of the UP-3981 CRTC board is changed as follows due to the addition of the C222 100 pF capacitor (NK code No. 071307):

From page	To page
39/46 in manual change information (0634-000059B)	2/2

The affected models are as follows:

Model	Main unit	Starting serial No.	Hardware revision
BSM-8301A/J/K	MU-831RA	02112	E2
	MU-831RJ	00369	D8
	MU-831RK	03395	G6
BSM-8302A/J/K	MU-832RA	00135	D4
	MU-832RJ	00441	D5
	MU-832RK	00651	E0


URAS-CAS [090D] [100D] [110D] [120D]
LRAS-CAS [090C] [100C] [110C] [120C]
XURAS
XUCAS
XUWE-WE
XUTR-OE
XLRAS
XLCAS
XLWE-WE
XLTR-OE
IC216 74AC158
IC217 74AC158
QUAD 2:1 MUX 16=+5V,8=E2
IC220 74AC244
IC221 74AC244
QUAD BUFFER/ LINE DRIVER 20=+5V,10=E2
LA00-LA07 [090A] [100A] [110A] [120A]
CLA00-CLA07 [065A]
UA00-UA07 [090C] [100C] [110C] [120C]
CUA00-CUA07 [065A]
DL212 DPS10-10
DL213 DPS10-10
IN 20nS 40nS 60nS 80nS GND TRM
R217 100F
R218 100F
C222 100pF
R240 100F
IC215 A 74AC00
IC215 C 74AC00
IC215 D 74AC00
IC107 D 74AC04
IC124 D 74AC02
IC219 A 74AC74
PRE CLR FF1
14=+5V,7=E2
ISYNCD [024A]
XM00 [064A]
ATR [087D]
XSASINH [007A]
DSP1 [002D]
DSLD [066D]
JH [030D]
XHSYNCD [024A]
X24M [002C]
XHSYNC2D [024A]
+5V
E2

0634-000059E

Nov 9, 1995

MANUAL CHANGE INFORMATION

Unit	Main Unit	Revision
VM-004P CRT Unit	MU-831RA	A1
	MU-831RJ	
	MU-831RK	
	MU-832RA	
	MU-832RJ	
	MU-832RK	

CRT Unit: The model of the CRT unit is changed. This change is reflected in the following changes in the Service Manual:

Section 4.2.5 CRT Unit VM-004P

From	To
Pages 4-49 to 4-52	Pages 2/12 to 5/12

Section 6.3 CRT Unit VM-004P

From	To
Pages 6-6 to 6-9	Pages 6/12 to 9/12

Section 10 Circuit Diagrams

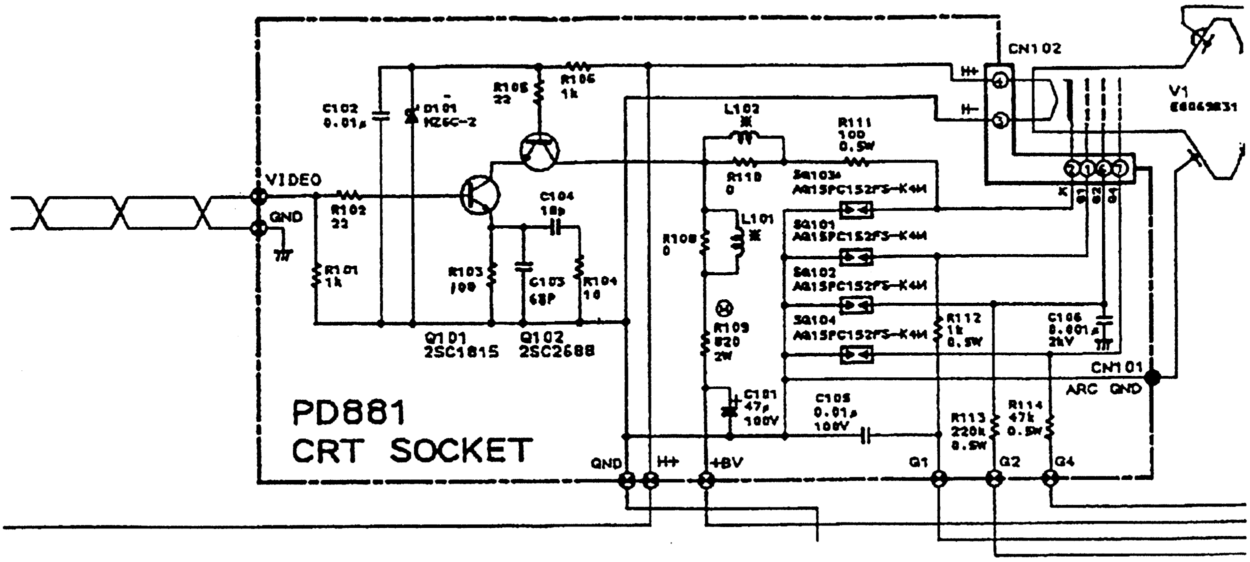
From	To
Page 10-45	Pages 10/12 to 12/12

4.2.5 CRT Unit VM-004P

CRT unit VM-004P receives synchronization signal and video signal from the CRTC board and displays on the screen. Screen brightness control is done by the volume on the front of the bedside monitor and the SUB-BRIGHT volume on the CRTC board.

1) Video signal circuit

Video signal from the CRTC board is input to the video signal amplifier on the board mounted on the neck of the CRT through the input connector. Video signal is approximately 8 times invertedly amplified and drives CRT cathode. R109 is metal oxide film resistor for heat tolerance due to large power exhaust in the resistor.

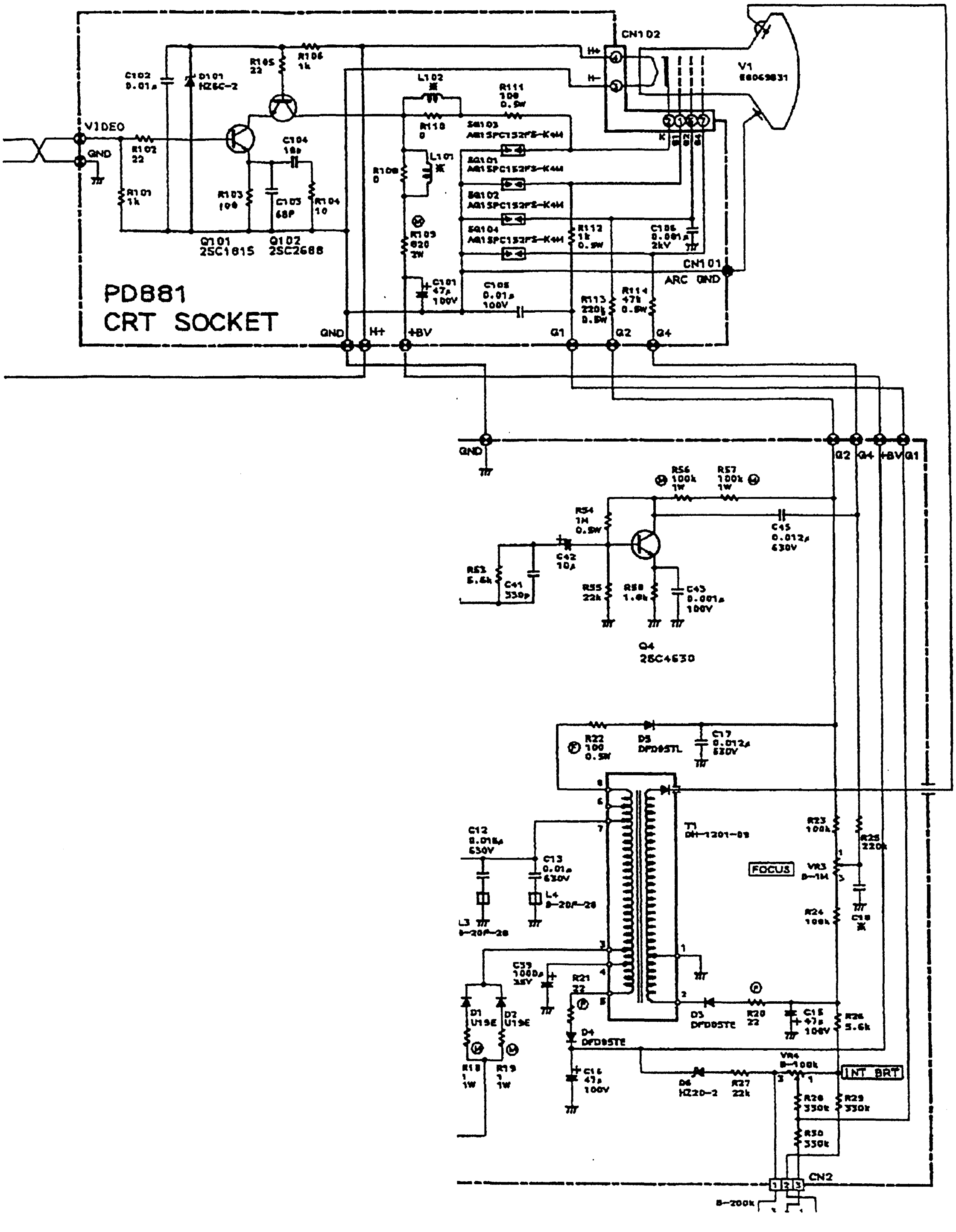


VIDEO
GND
R102 22
R101 1k
C102 0.01μ
D101 HZ6C-2
R105 22
R106 1k
R103 100
C103 68P
C104 18p
R104 10
Q101 2SC1815
Q102 2SC2688
PD881
CRT SOCKET
L102 ※
R110 0
R111 100 0.5W
R108 0
L101 ※
R109 820 2W
C101 47μ 100V
SG103
AG15PC152FS-K4M
SG101
AG15PC152FS-K4M
SG102
AG15PC152FS-K4M
SG104
AG15PC152FS-K4M
C105 0.01μ 100V
R112 1k 0.5W
R113 220k 0.5W
R114 47k 0.5W
C106 0.001μ 2kV
CN102
H+
H-
V1
CN101
ARC GND
K
G1
G2
G4
GND
H+
+BV
G1
G2
G4

2) CRT and peripherals

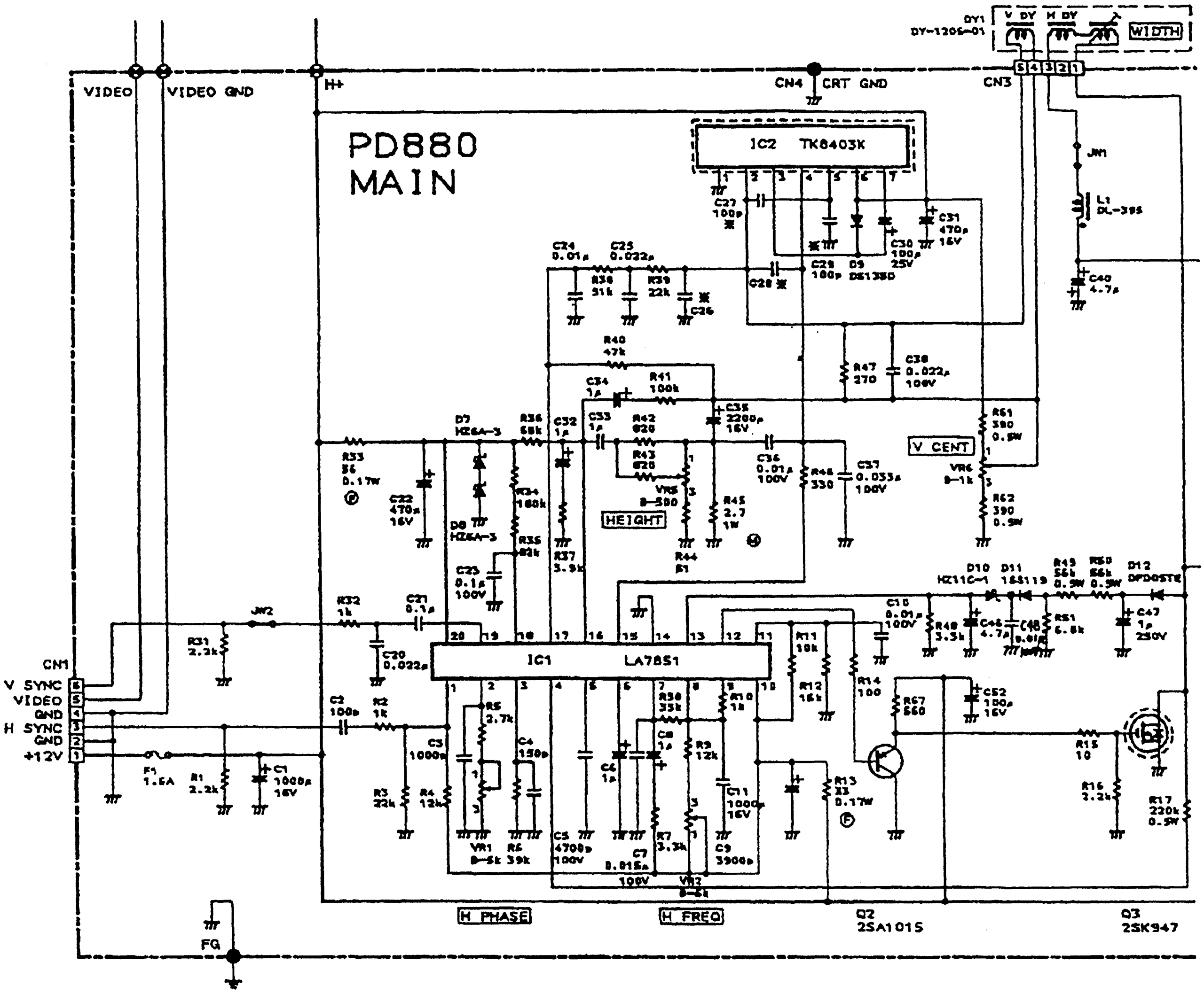
Electron beam controlled by this bias voltage between the first grid voltage and video signal voltage illuminates fluorescent screen of the CRT. By shifting first grid voltage, overall screen brightness can be controlled. Charge circuit composed of C15, R28, R29 and R30 is a spot killer which prevents electron beam focusing at the center of the screen at power off which will burn fluorescent material.

The fourth grid controls the focusing of the screen.


PD881
CRT SOCKET
VIDEO
GND
C102 0.01μ
D101 HZ6C-2
R105 22
R106 1k
R102 22
R101 1k
R103 100
C104 18p
C103 68P
R104 10
Q101 2SC1815
Q102 2SC2688
L102
R111 100 0.5W
R110 0
SG103 AB1SPC152FS-K4M
SG101 AB1SPC152FS-K4M
SG102 AB1SPC152FS-K4M
SG104 AB1SPC152FS-K4M
R108 0
L101
R109 820 3W
C101 47μ 100V
C105 0.01μ 100V
R112 1k 0.5W
R113 220k 0.5W
R114 47k 0.5W
C106 0.001μ 2kV
CN102
H+
H−
V1
K
G1
G2
G4
CN101
ARC GND
GND
H+
+BV
G1
G2
G4
GND
G2
G4
+BV
G1
R56 100k 1W
R57 100k 1W
R54 1M 0.5W
C45 0.012μ 630V
C42 10μ
R53 5.6k
C41 330p
R55 22k
R58 1.8k
C43 0.001μ 100V
Q4 2SC4630
R22 100 0.5W
D5 DFD05TL
C17 0.012μ 630V
T1
C12 0.018μ 630V
C13 0.01μ 630V
L4 B-20F-28
L3 B-20F-28
R23 100k
R25 220k
FOCUS
VR3 B-1M
R24 100k
C18
C33 1000μ 35V
R21 22
D1 U19E
D2 U19E
R18 1 1W
R19 1 1W
D4 DFD05TE
C16 47μ 100V
D3 DFD05TE
R20 22
C15 47μ 100V
R26 5.6k
VR4 B-100k
INT BRT
D6 HZ20-2
R27 22k
R28 330k
R29 330k
R30 330k
CN2
B-200k

3) Vertical deflection circuit

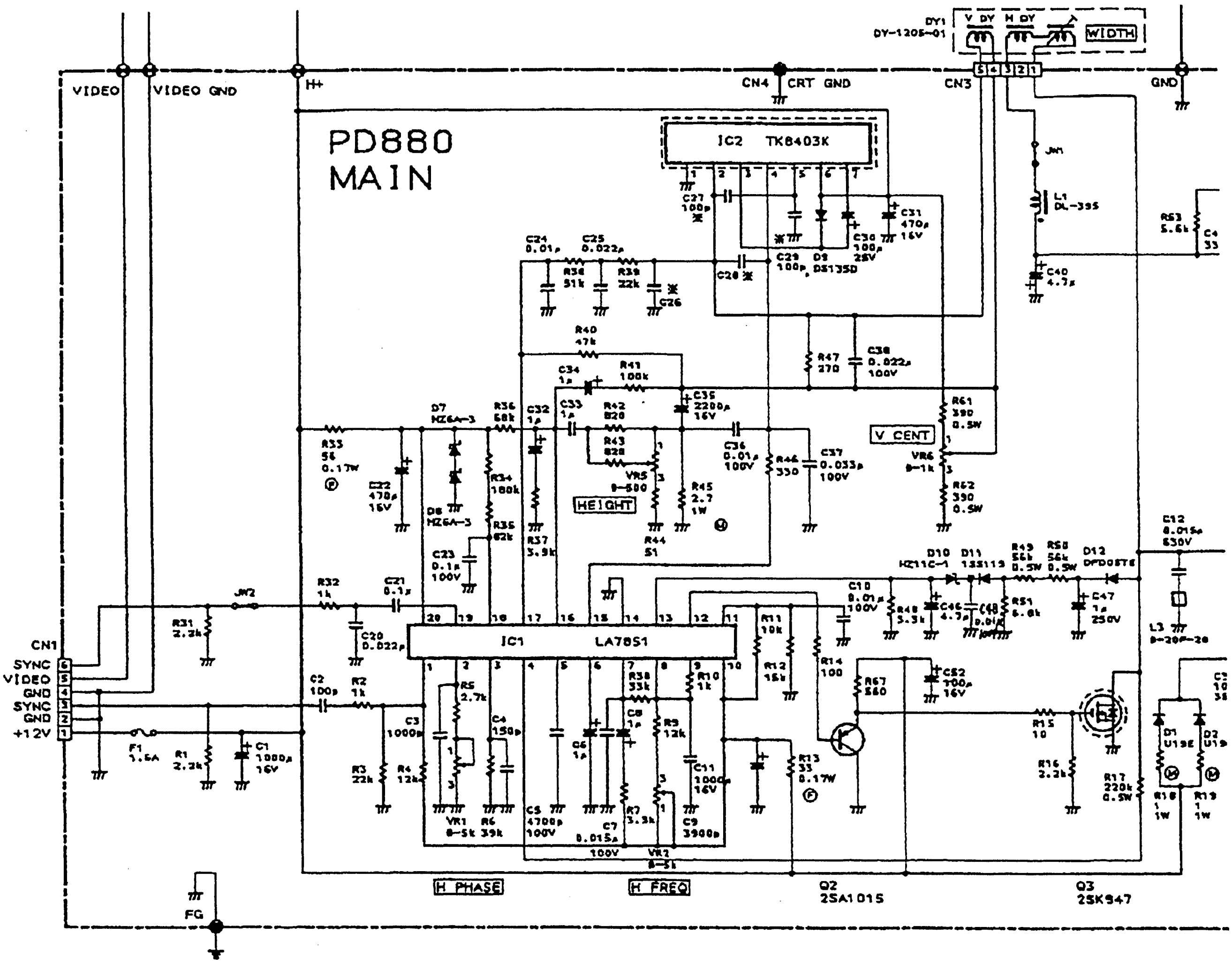
Vertical synchronization signal is input to IC1 pin-19 and controls ON/OFF of the charge/discharge circuit composed of C23, R34 and R35 to generate approximately 62 kHz sawtooth voltage. This sawtooth voltage output from IC1 through pin-15 to input to IC2 pin 4 for amplification. After amplification, the signal is output from IC2 through pin-5 to drive the vertical deflection yoke. VR5 is used to adjust the vertical amplitude.


PD880
MAIN
VIDEO
VIDEO GND
H+
CN4
CRT GND
CN3
DY1
DY-1205-01
V DY
H DY
WIDTH
IC2 TK8403X
IC1 LA7851
CN1
V SYNC
VIDEO
GND
H SYNC
GND
+12V
F1 1.6A
HEIGHT
V CENT
H PHASE
H FREQ
Q2
2SA1015
Q3
2SK947
L1
DL-395
FG

4) Horizontal deflection circuit

Sawtooth voltage is generated by charge/discharge circuit composed of C11, R9 and VR2. The frequency is automatically controlled with AFC (Automatic Frequency Control) circuit to 24.6 kHz is synchronized with horizontal synchronization signal. Driver Q2 output the horizontal synchronization signal to MOS-FET Q3 to drive the horizontal deflection circuit and high voltage circuit.

WIDTH Coil inserted in series to deflection yoke is for horizontal width adjustment and L1 is for fine linearity adjustment.


PD880
MAIN
VIDEO
VIDEO GND
H+
CN4
CRT GND
CN3
GND
DY1
DY-1205-01
V DY
H DY
WIDTH
IC2 TK8403K
IC1 LA7851
CN1
SYNC
VIDEO
GND
SYNC
GND
+12V
L1
DL-335
V CENT
VR6
HEIGHT
VR5
H PHASE
H FREQ
VR1
VR2
C11
R9
Q2
2SA1015
Q3
2SK947
D7
HZ6A-3
D8
HZ6A-3
D10
D11
D12
FG
JW1
JW2
F1
1.6A

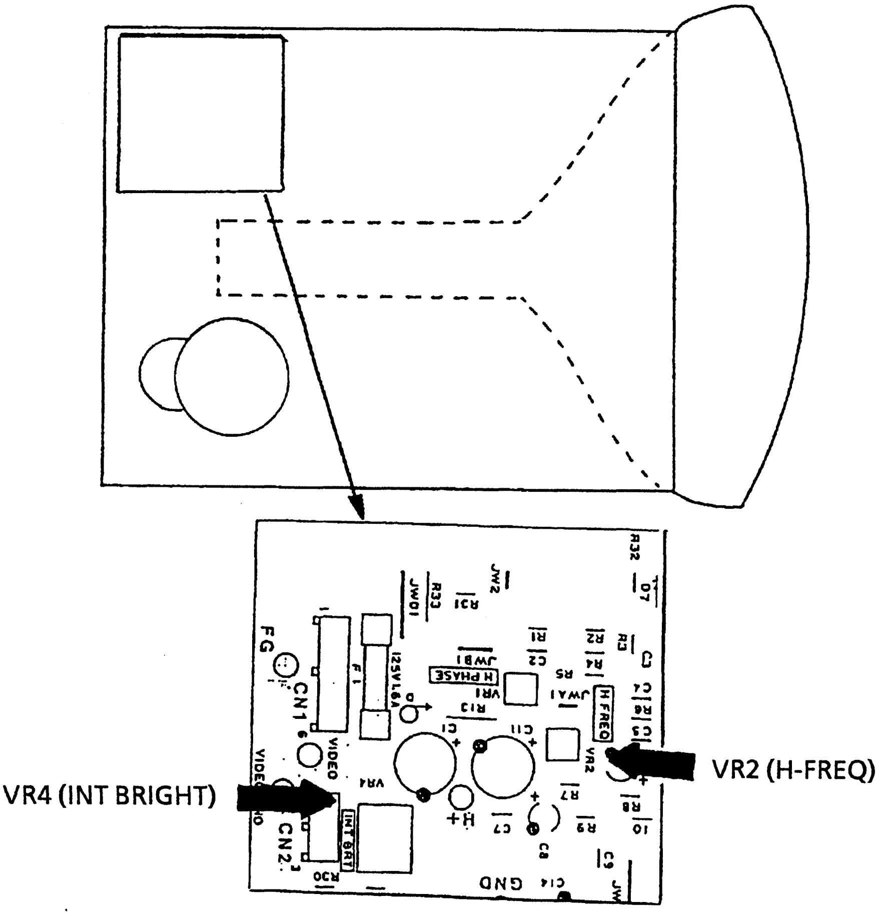
6.3 CRT Unit VM-004P

CRT unit has adjustment points of screen synchronization, brightness, screen size, position and focusing. Call up the Self Test Screen No.2 to assist in the adjustment.

1) Horizontal synchronization
i. Find out volume position points by rotating the VR2 (H-FREQ) clockwise and counterclockwise where the screen becomes out of horizontal synchronization.
ii. Set the volume position at the center of these two points. This point is assumed to be the center position points if the screen does not become out of synchronization even when the volume is fully rotated clockwise or counterclockwise.

2) Screen brightness
If screen is dark and not bright enough even if screen is cleaned and CRTC board SUB-BRIGHT is adjusted, adjust the CRT unit brightness. When this adjustment is required, the CRT unit is near the end of its use life. Prepare a new CRT unit for the bedside monitor.

Adjust VR4 (INT BRIGHT) to bright up the screen. If you have an illumination meter, adjust this VR4 (INT BRIGHT) until the Self Test All Raster mode screen reads 240 cd/m² ±20 cd/m² on the illumination meter.



3) Screen size

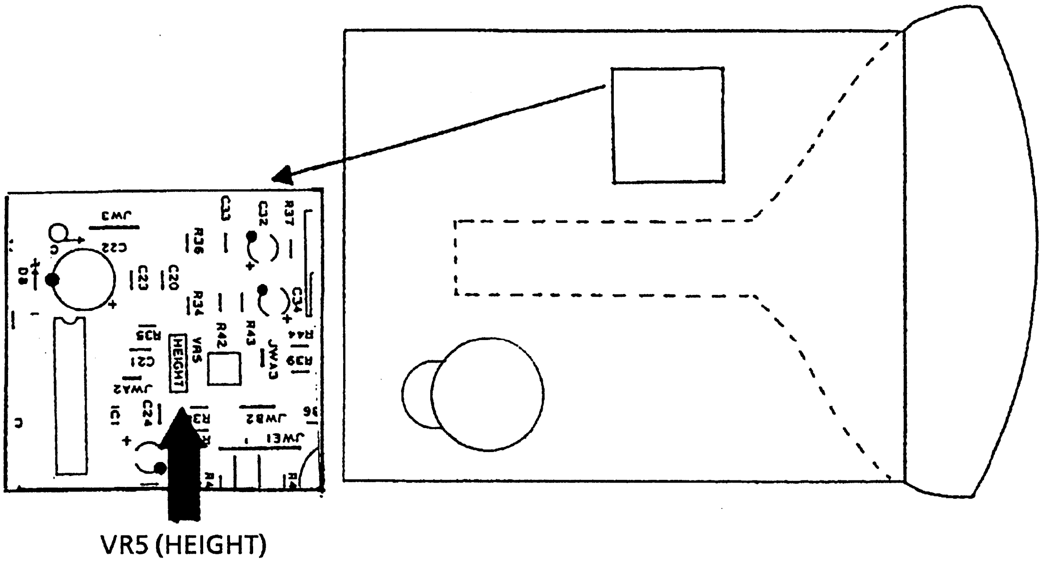
Adjustment of vertical and horizontal size of the screen. Use the Self Test Grid screen for this adjustment.

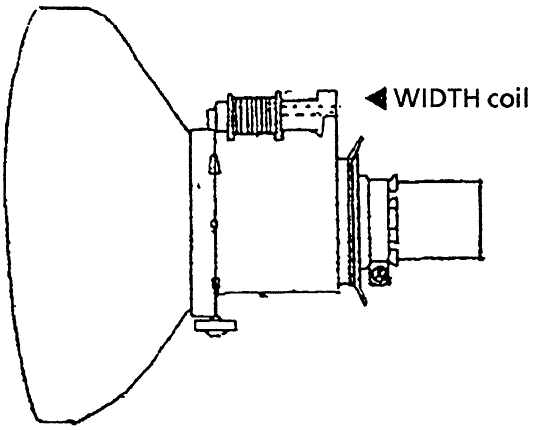
i. Adjust VR5 (HEIGHT) until the screen height becomes 120 ±4 mm.

ii. Use a ferrite core screwdriver to adjust WIDTH coil of the CRT unit until the screen width becomes 160 ±4 mm.

NOTE

Use a ferrite core screwdriver or a plastic made screwdriver to adjust the WIDTH coil because other screwdrivers may damage the core of the WIDTH coil.

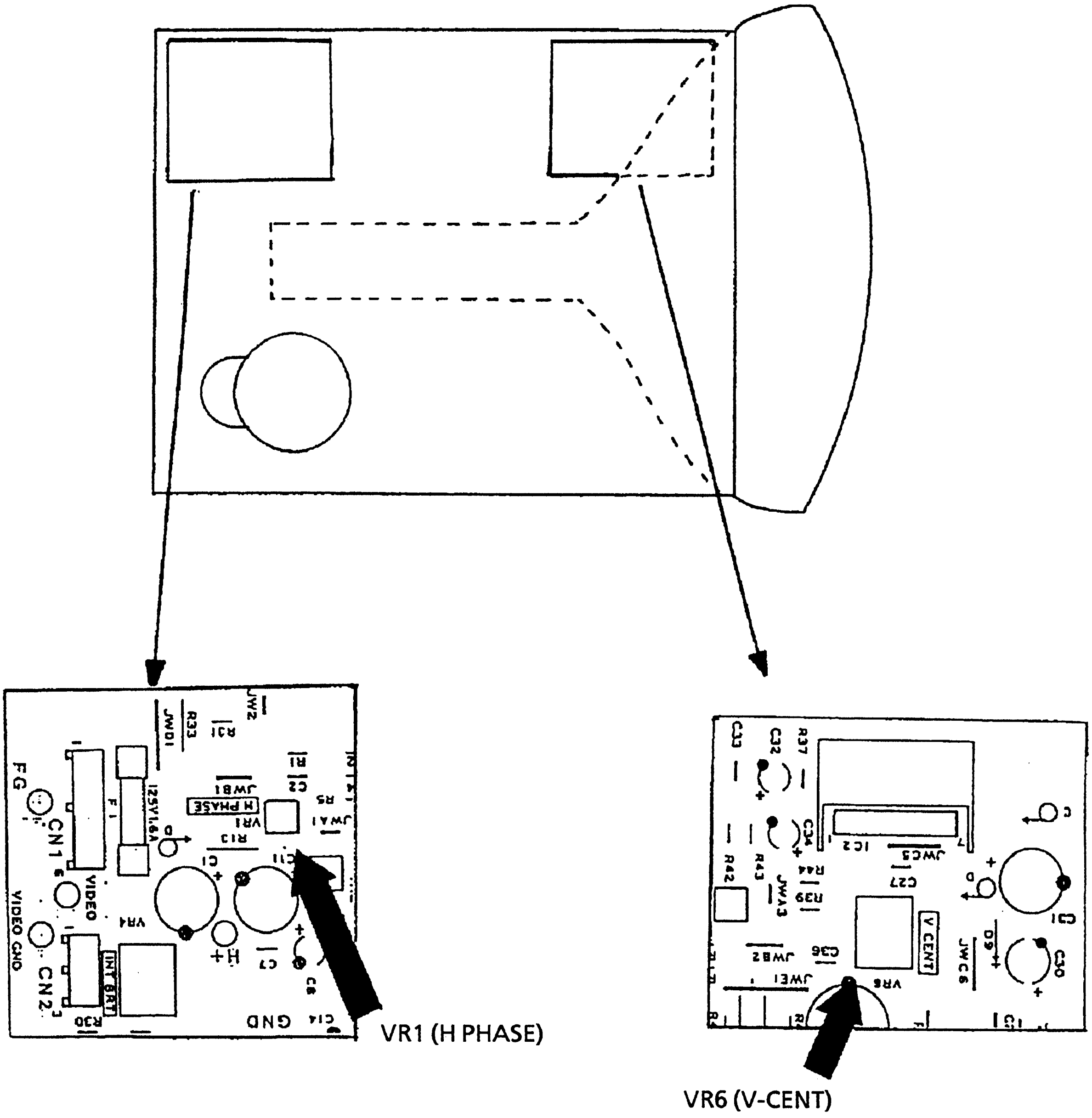




4) Screen position

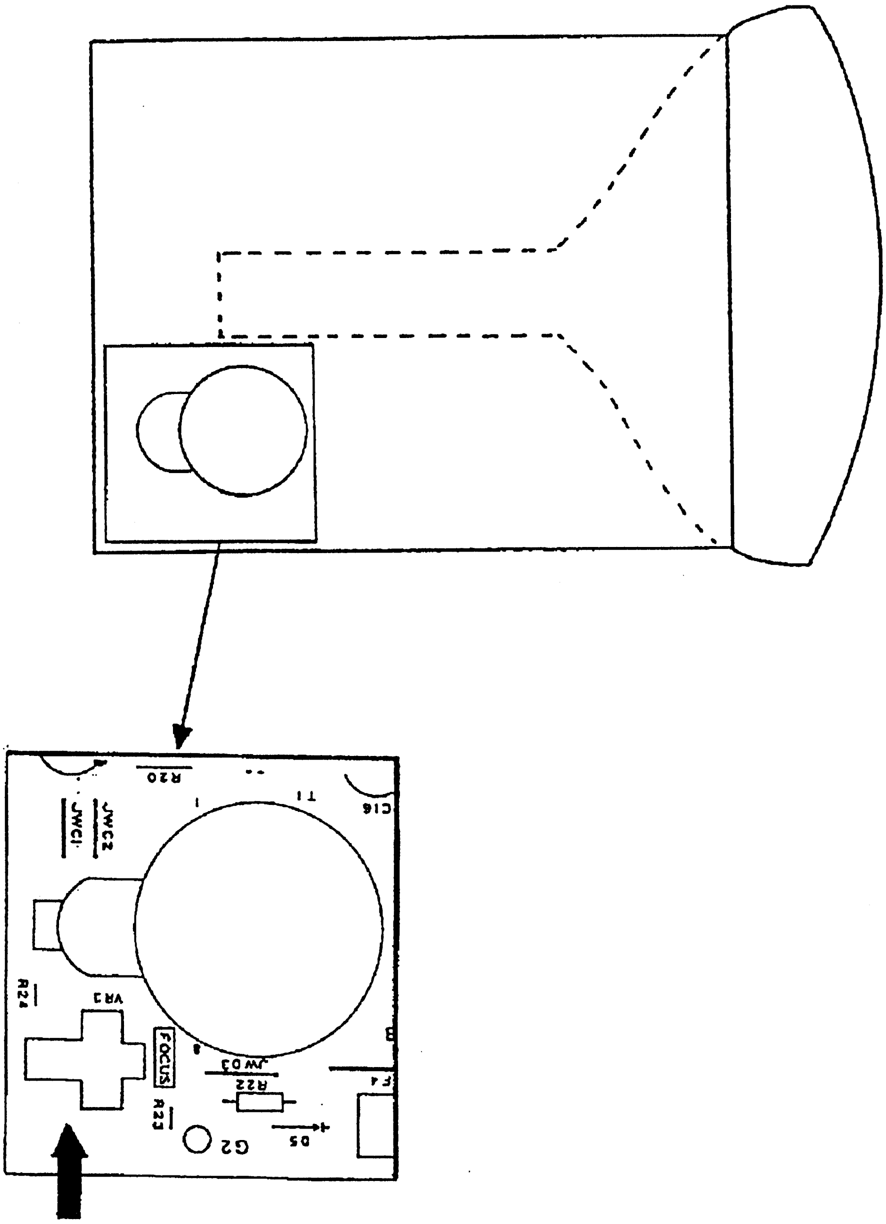
Adjustment of the raster position.

Adjust the VR6 (V-CENT) and VR1 (H PHASE) until the display area is at the center of the screen.

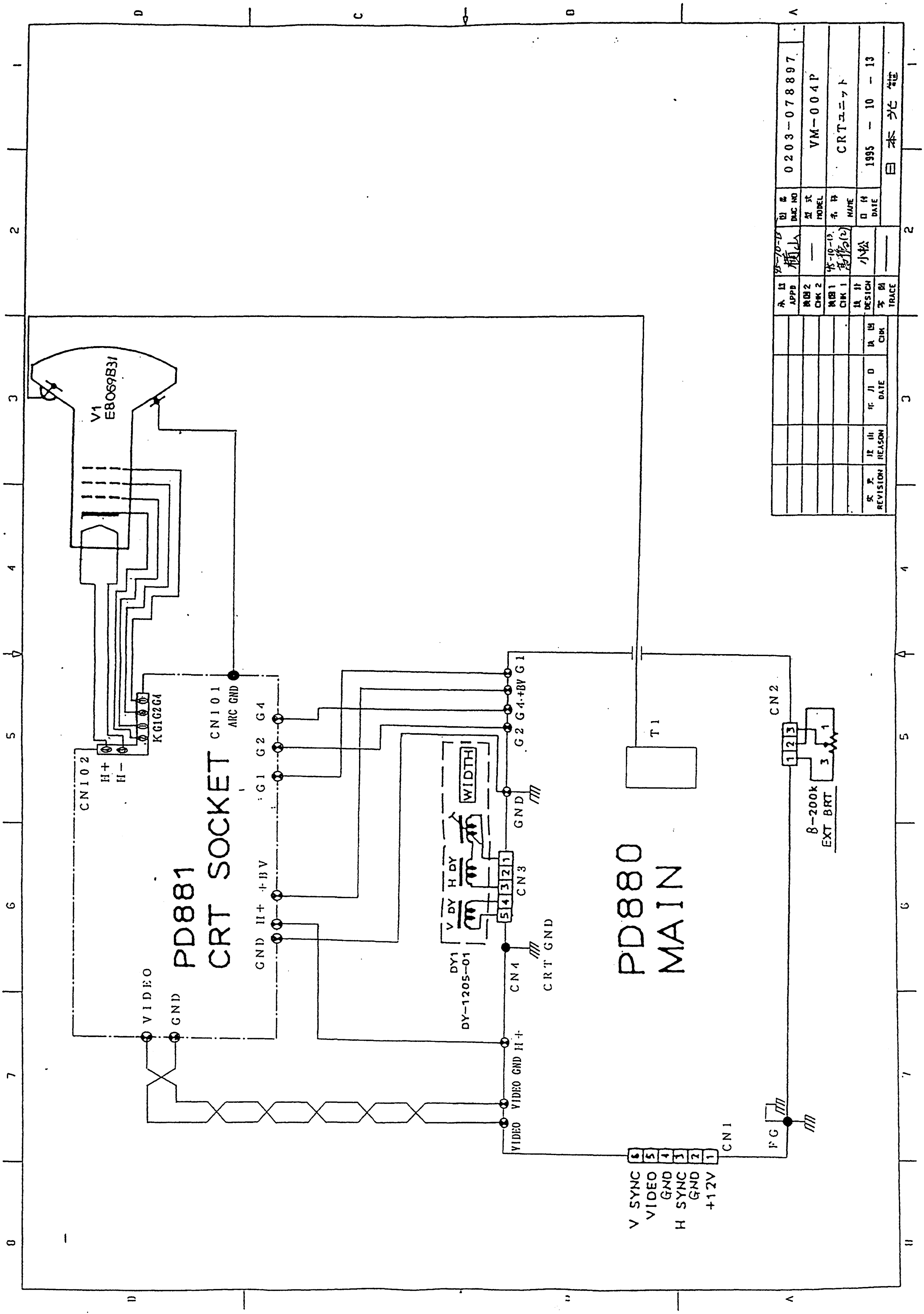

VR1 (H PHASE)
VR6 (V-CENT)

5) Focusing

Adjust VR3 (FOCUS) until the entire screen is in focus.

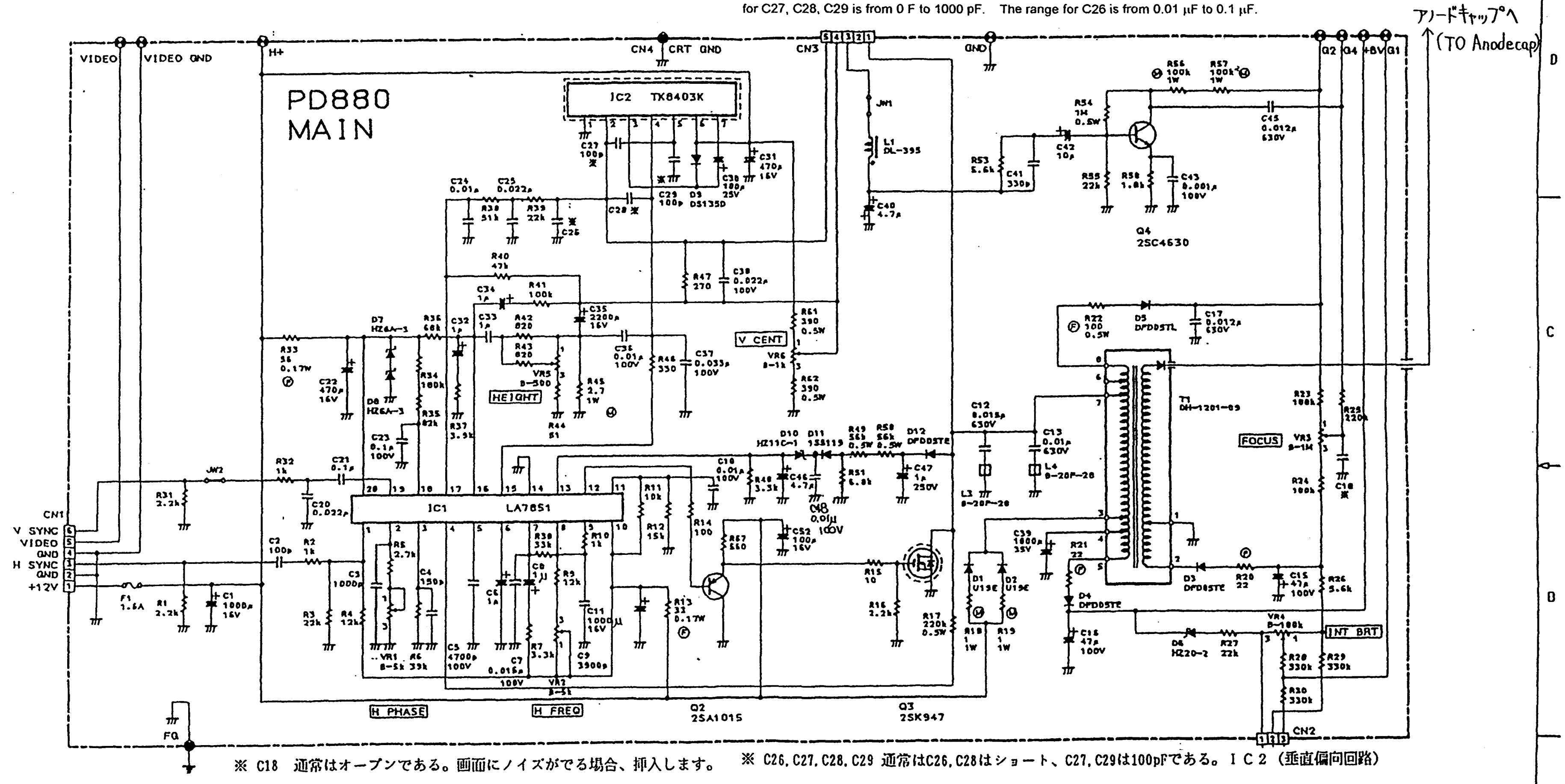

R20
T1
C16
JWC2
JWC1
R24
VR3
FOCUS
JW03
R22
R23
G2
D5
F4

VR3 (FOCUS)


PD881
CRT SOCKET
PD880
MAIN
V1
E8069B31
CN102
H+
H−
K G1 G2 G4
CN101
ARC GND
G4
G2
G1
+BV
H+
GND
VIDEO
GND
G1
G4 +BV
G2
GND
WIDTH
H DY
V DY
CN3
DY1
DY-1205-01
CN4
CRT GND
H+
GND
VIDEO
T1
CN2
B-200k
EXT BRT
FG
CN1
V SYNC
VIDEO
GND
H SYNC
GND
+12V
0203-078897
VM-004P
CRTユニット
1995 - 10 - 13
DWG NO
MODEL
NAME
DATE
APPD
CHK 2
CHK 1
DESIGN
TRACE
REVISION
REASON
DATE
CHK

※ C18: This capacitor is not mounted when shipped. Mount capacitor when noise appeared on the screen. The range for C18 is from 0.01 μF to 0.1 μF.

※ C26, C27, C28, C29: Capacitors C26 and C28 are not mounted when shipped. The printed patterns for C26 and C28 are short. C27 and C29 are mounted with 100 pF capacitors when shipped. Replace, mount or change these capacitors when the IC2 (vertical deflection circuit) becomes unstable. The range for C27, C28, C29 is from 0 F to 1000 pF. The range for C26 is from 0.01 μF to 0.1 μF.


アノードキャップへ
(TO Anodecap)
PD880
MAIN
VIDEO
VIDEO GND
H+
CN4 CRT GND
CN3
GND
G2 G4 +8V G1
IC2 TX8403K
IC1 LA7851
CN1
V SYNC
VIDEO
GND
H SYNC
GND
+12V
F1 1.6A
JW1
JW2
L1 DL-395
Q4 2SC4630
Q2 2SA1015
Q3 2SK947
T1 DH-1201-09
FOCUS
V CENT
HEIGHT
H PHASE
H FREQ
INT BRT
CN2
FG
VR1 B-5k
VR2 B-5k
VR3 B-1M
VR4 B-100k
VR5 B-500
VR6 B-1k
D1 U19E
D2 U19E
D3 DFD05TE
D4 DFD05TE
D5 DFD05TL
D7 HZ6A-3
D8 HZ6A-3
D9 DS135D
D10 HZ11C-1
D11 1SS119
D12 DFD05TE
D6 HZ20-2
L3 B-20F-20
L4 B-20F-20
C27 100p ※
C28 ※
C29 100p
C26 ※
C18 ※
C31 470μ 16V
C30 100μ 25V
C24 0.01μ
C25 0.022μ
R38 51k
R39 22k
R47 270
C38 0.022μ 100V
R40 47k
C34 1μ
R41 100k
C35 2200μ 16V
R36 68k
C32 1μ
C33 1μ
R42 820
R43 820
C36 0.01μ 100V
R46 330
C37 0.033μ 100V
R61 390 0.5W
R62 390 0.5W
R33 56 0.17W
C22 470μ 16V
R34 180k
R35 82k
R37 3.3k
R45 2.7 1W
R44 51
C23 0.1μ 100V
R32 1k
C21 0.1μ
C20 0.022μ
R31 2.2k
C2 100p
R2 1k
C3 1000p
R3 22k
R4 12k
R1 2.2k
C1 1000μ 16V
R5 2.7k
C4 150p
C5 4700p 100V
R6 39k
C6 1μ
R38 33k
C8 1μ
R9 12k
C7 0.015μ 100V
R7 3.3k
R10 11
C11 1000μ 16V
C9 3900p
R11 10k
R12 15k
R13 33 0.17W
R14 100
R67 560
C52 100μ 16V
C10 0.01μ 100V
R48 3.3k
C46 4.7μ
C48 0.01μ 100V
R49 56k 0.5W
R50 56k 0.5W
R51 6.8k
C47 1μ 250V
R15 10
R16 2.2k
R17 220k 0.5W
R18 1 1W
R19 1 1W
C12 0.015μ 630V
C13 0.01μ 630V
C39 1000μ 35V
R21 22
C16 47μ 100V
R20 22
C15 47μ 100V
R26 5.6k
R27 22k
R28 330k
R29 330k
R30 330k
R22 100 0.5W
C17 0.012μ 630V
R23 100k
R24 100k
R25 220k
R53 5.6k
C41 330p
C42 10μ
R54 1M 0.5W
R55 22k
R58 1.8k
C43 0.001μ 100V
R56 100k 1W
R57 100k 1W
C45 0.012μ 630V
C40 4.7μ

※ C18　通常はオープンである。画面にノイズがでる場合、挿入します。

C：0.01μF ～ 0.1μF

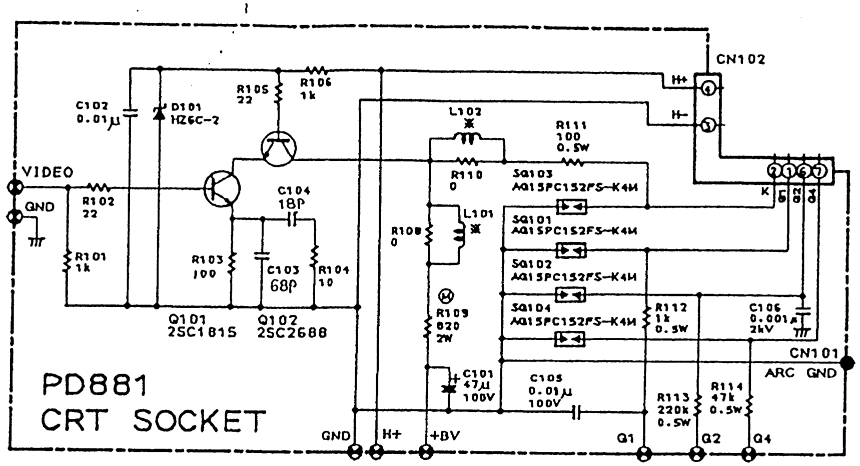
※ C26, C27, C28, C29　通常はC26, C28はショート、C27, C29は100pFである。ＩＣ２（垂直偏向回路）が不安定な場合、挿入及び値の変更を行います。

C27, C28, C29：0 F ～ 1000pF　C26：0 F, 0.01μF ～ 0.1μF

1. All capacitors are 50WV unless otherwise noted. Unit is in FARAD(F).
2. All resistors are 0.25W unless otherwise noted. Unit is in OHM(Ω).
3. Components marked with ※ are subject to change without notice.
4. Semiconductors may be changed for equivalent ones.
5. Ⓜ : Fixed Metal Film Resistor
6. Ⓕ : Fuse Resistor

変更 REVISION	理由 REASON	年月日 DATE	検印 CHK

承認 APPD	95-10-13 横山	図番 DWG NO	0203-078879
検図2 CHK 2	—	型式 MODEL	VM-004P
検図1 CHK 1	95-10-13 高橋(2)	名称 NAME	CRTユニット MAIN
設計 DESIGN	小松	日付 DATE	1995 - 10 - 13
写図 TRACE	—		日本光電


PD881
CRT SOCKET
CN102
H+
H−
CN101
ARC GND
K
VIDEO
GND
R102 22
R101 1k
C102 0.01µ
D101 HZ6C-2
R105 22
R106 1k
Q101 2SC1815
Q102 2SC2688
R103 100
C104 18P
C103 68P
R104 10
L102 ※
R110 0
R111 100 0.5W
L101 ※
R108 0
Ⓜ R109 820 2W
C101 47µ 100V
SQ103 AQ15PC152FS-K4M
SQ101 AQ15PC152FS-K4M
SQ102 AQ15PC152FS-K4M
SQ104 AQ15PC152FS-K4M
R112 1k 0.5W
C106 0.001µ 2kV
C105 0.01µ 100V
R113 220k 0.5W
R114 47k 0.5W
GND
H+
+BV
Q1
Q2
Q4

※ L101, L102　通常はオープンである。VIDEO信号のｆ特が悪い場合挿入します（その場合、R108・R110はＬの値に応じて変える必要あり）。Ｌ：1µH ～ 10µH

※　L101, L102:　These inductors are not mounted when shipped.　Mount inductor to change the R108 or R110 when frequency response characteristic of the VIDEO signal is off.　The range for L101 or L102 is from 1µH to 10 µH.

1. All capacitors are 50WV unless otherwise noted. Unit is in FARAD(F).
2. All resistors are 0.25W unless otherwise noted. Unit is in OHM(Ω).
3. Components marked with ※ are subject to change without notice.
4. Semiconductors may be changed for equivalent ones.
5. Ⓜ : Fixed Metal Film Resistor
6. Ⓕ : Fuse Resistor

				承認 APPD	95-10-13 横山	図番 DWG NO	0203-078888
				検図2 CHK 2	—	型式 MODEL	VM-004P
				検図1 CHK 1	95-10-13 高橋(2)	名称 NAME	CRTユニット　CRTソケット
				設計 DESIGN	小松	日付 DATE	1995 − 10 − 13
変更 REVISION	理由 REASON	年月日 DATE	検図 CHK	写図 TRACE	—		日本光電

0634-000059D

MANUAL CHANGE INFORMATION

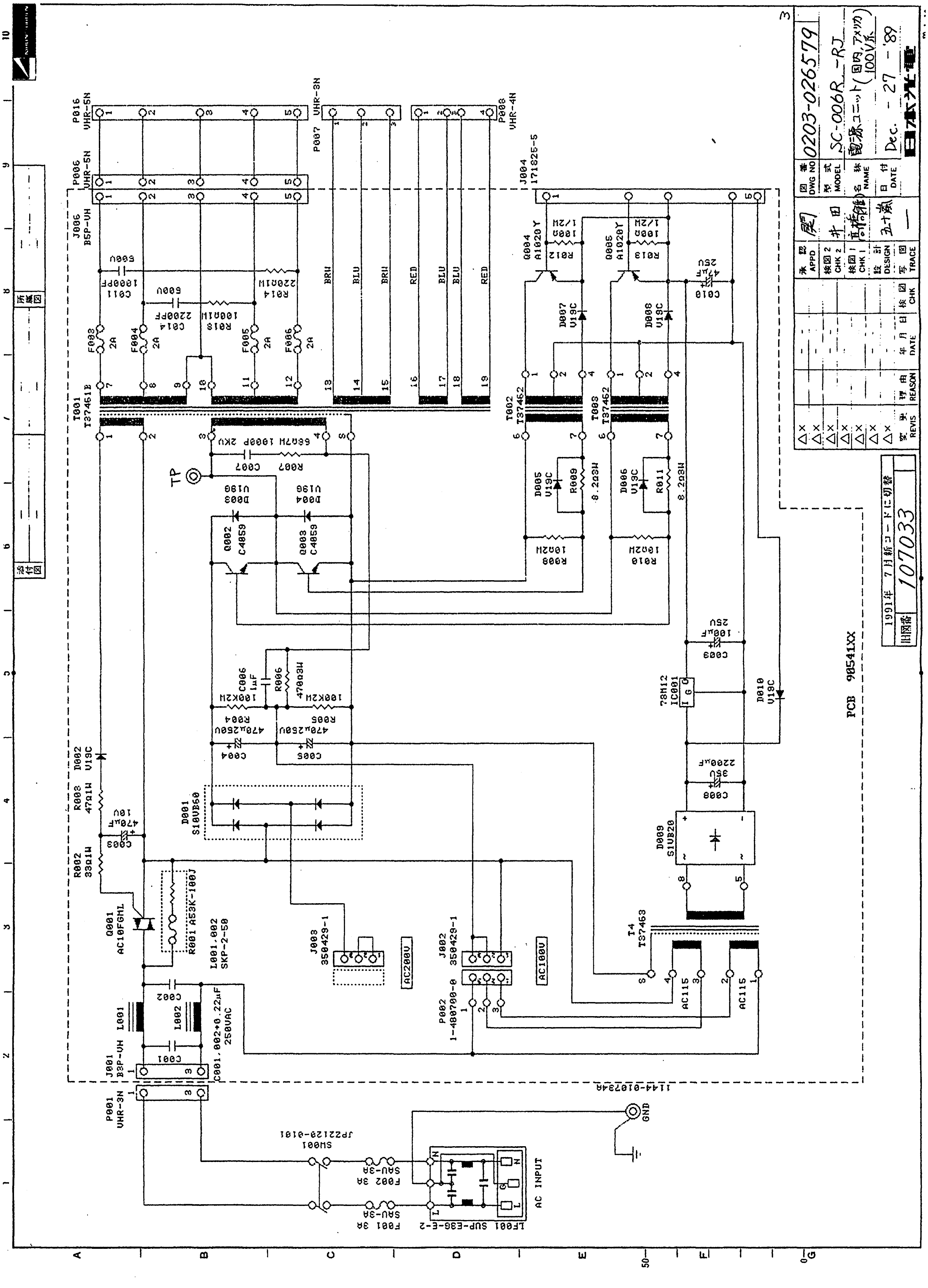
Model	Power Unit
BSM-8301A/J/K	SC-006R
	SC-006RJ
	SC-006RK
BSM-8302A/J/K	SC-006R
	SC-006RJ
	SC-006RK

Circuit Diagram

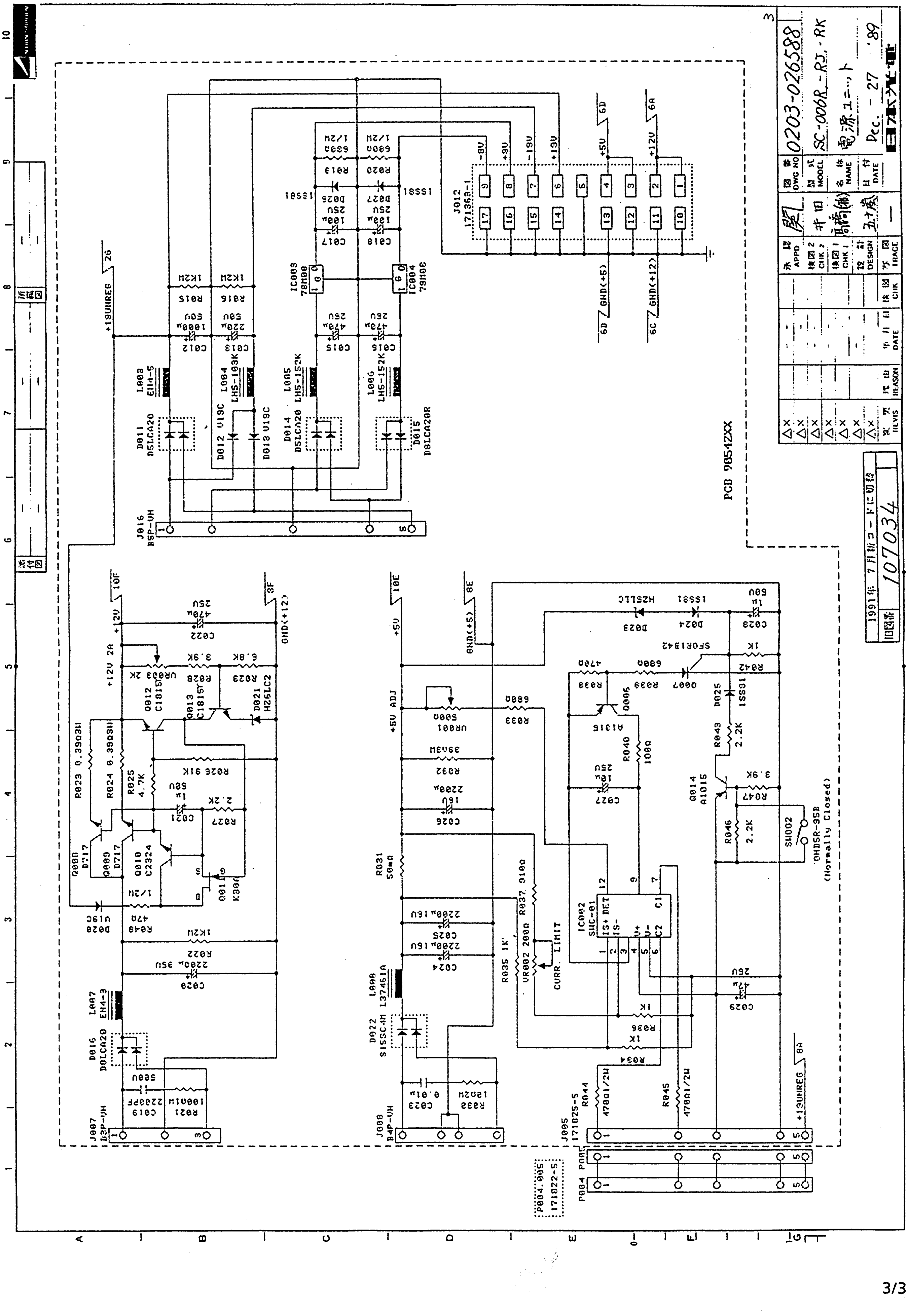
The circuit diagrams in section 10 of the service manual are changed as follows.

From Page	To Page
10-42 to 10-43	2/3 to 3/3

MANUAL CHANGE INFORMATION



0203-026579
SC-006R-RJ
電源ユニット(国内,アメリカ) 100V系
Dec.-27-'89
1991年 7月新コードに切替
107033
PCB 90541XX
AC INPUT
GND
P001 VHR-3N
J001 B3P-UH
P002 1-480700-0
J002 350429-1
J003 350429-1
AC100V
AC200V
AC115
T001 T37461B
T002 T37462
T003 T37462
T4 T37463
D001 S10VB60
D009 S1VB20
IC001 78M12
Q001 AC10FGML
Q002 C4059
Q003 C4059
Q004 A1020Y
Q005 A1020Y
LF001 SUP-E36-E-2
F001 3A SAU-3A
F002 3A SAU-3A
SW001 JP22120-0101
L001,002 SKP-2-50
C001,002 0.22μF 250VAC
R001 A53K-100J
J006 B5P-VH
P006 VHR-5N
P016 VHR-5N
P007 VHR-3N
P008 VHR-4N
J004 171825-5
BRN
BLU
RED
TP
1144-01073A


0203-026588
SC-006R-RJ-RK
電源ユニット
Dec. 27 '89
PCB 9B542XX
1991年 7月 新コードに切替
107034
J016 B5P-VH
J012 171369-1
J007 B3P-VH
J008 B4P-VH
J005 171825-5
P004 P005
P004,005 171822-5
D011 D5LCA20
D012 V19C
D013 V19C
D014 D5LCA20
D015 D8LCA20R
L003 EHH-5
L004 LH5-103K
L005 LH5-152K
L006 LH5-152K
IC003 78M08
IC004 79M08
+19UNREG
-8V
+8V
-19V
+13V
+5V
+12V
GND(+5)
GND(+12)
+12V 2A
UR003 2K
Q012 C1815
Q013 C1815
D021 H26LC2
Q008 D717
Q009 D717
Q010 C2324
Q016 K30A
D016 D8LCA20
L007 EH4-3
+5V ADJ
UR001 500Ω
D022 S15SC4M
L008 L37451A
IC002 SHC-01
UR002 200Ω
CURR. LIMIT
Q006 A1015
Q014 A1015
SH002 OHDSR-35B (Normally Closed)
SF0R1342
1SS81
H25LLC

0634-000059C

MANUAL CHANGE INFORMATION

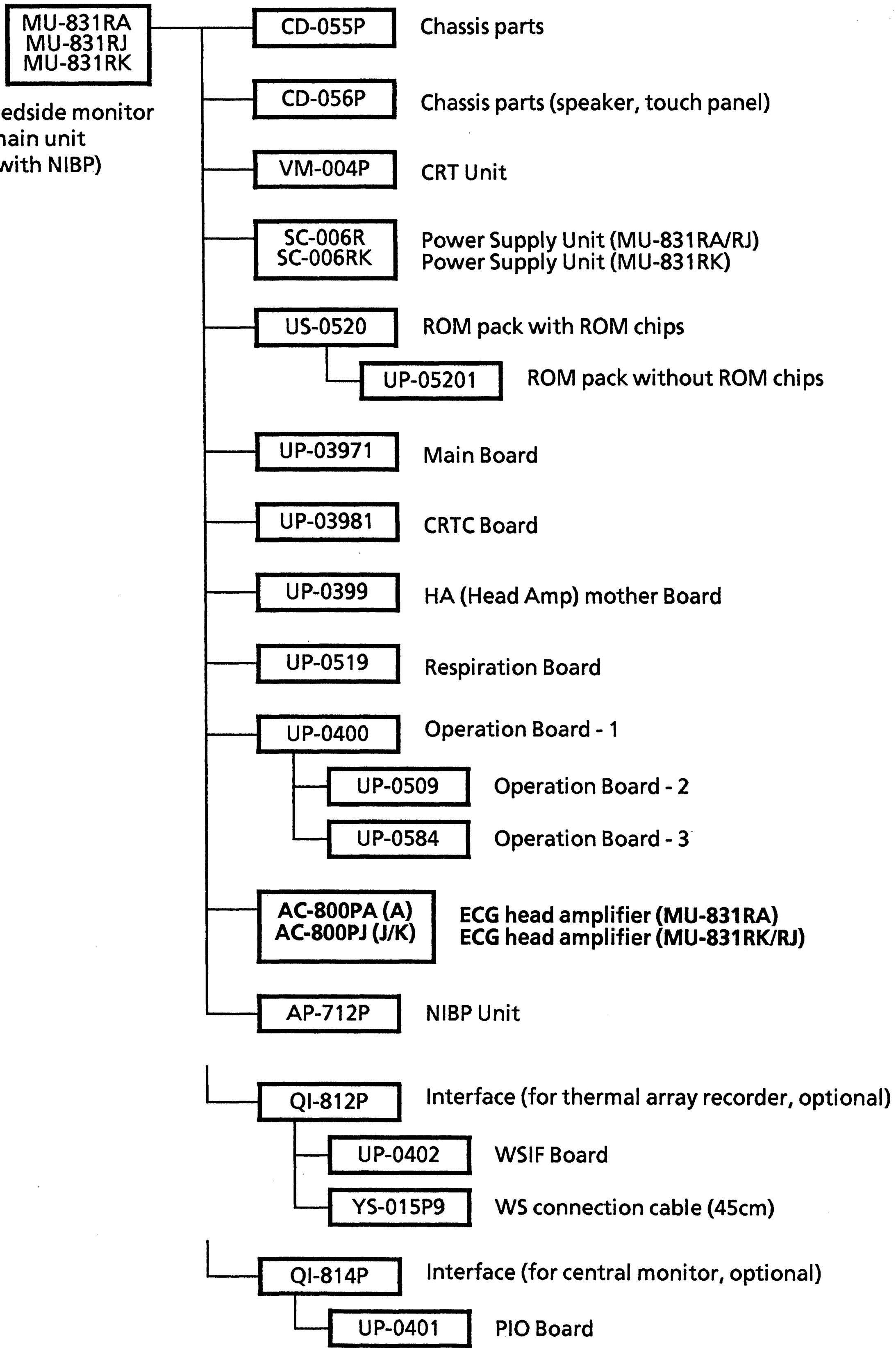
Model	Main Unit	Revision	Software Revision	Starting SerialNo.
BSM-8301A/J/K	MU-831RA	D1	A3 - 04	01406
	MU-831RJ	D1	A3 - 04	00196
	MU-831RK	E1	A3 - 04	01311
BSM-8302A/J/K	MU-832RA	D1	A3 - 04	00128
	MU-832RJ	D1	A3 - 04	00241
	MU-832RK	D1	A3 - 04	00411

Change: The fixed ECG Head Amp (AC-800PA/PJ) on the main unit is made removable, and therefore, became an option. This change causes a minor change in the system composition shown on the following pages.

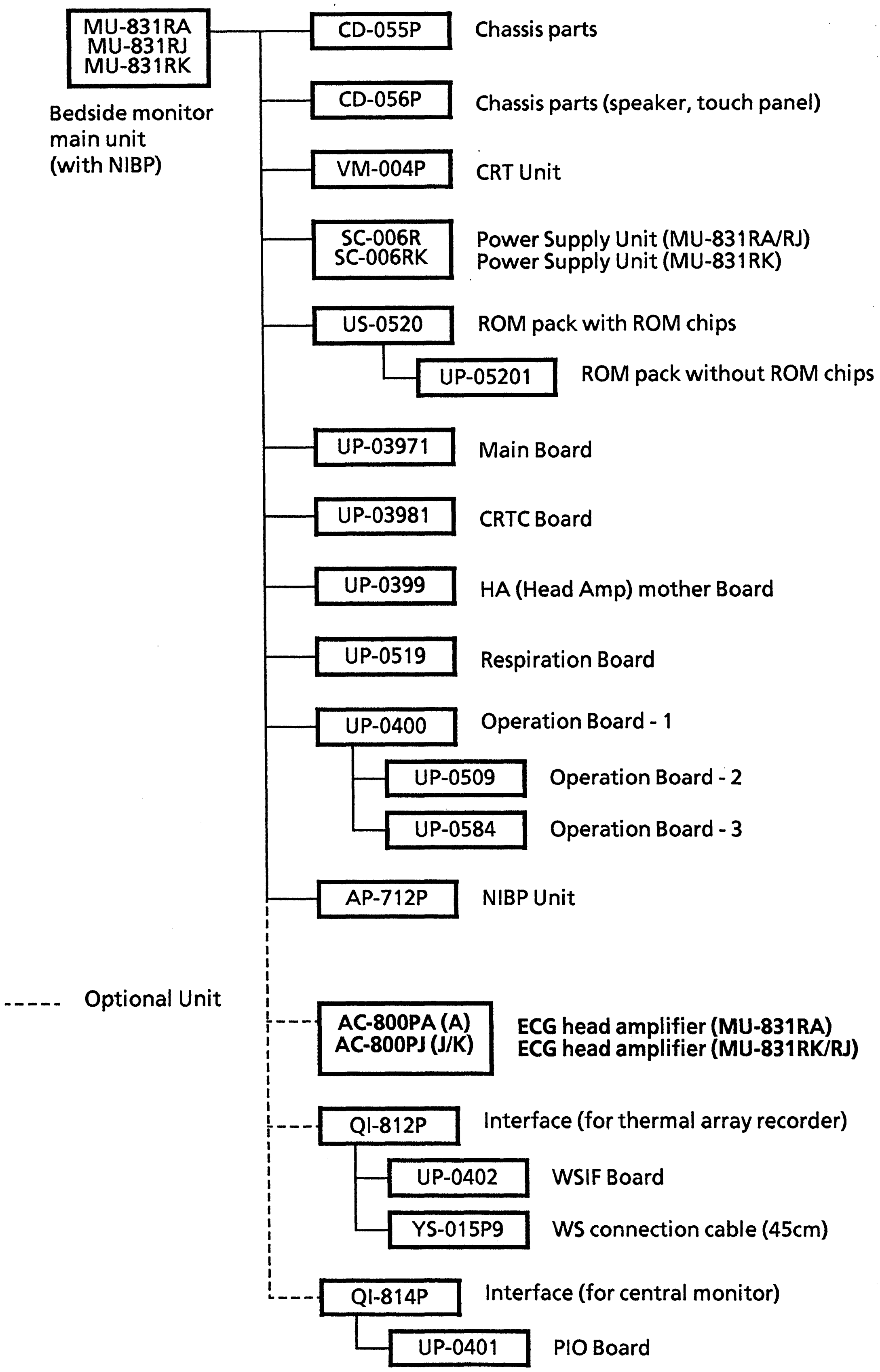
MANUAL CHANGE INFORMATION

Section 1: 1) System Composition-1 (Page 1-2)

FROM

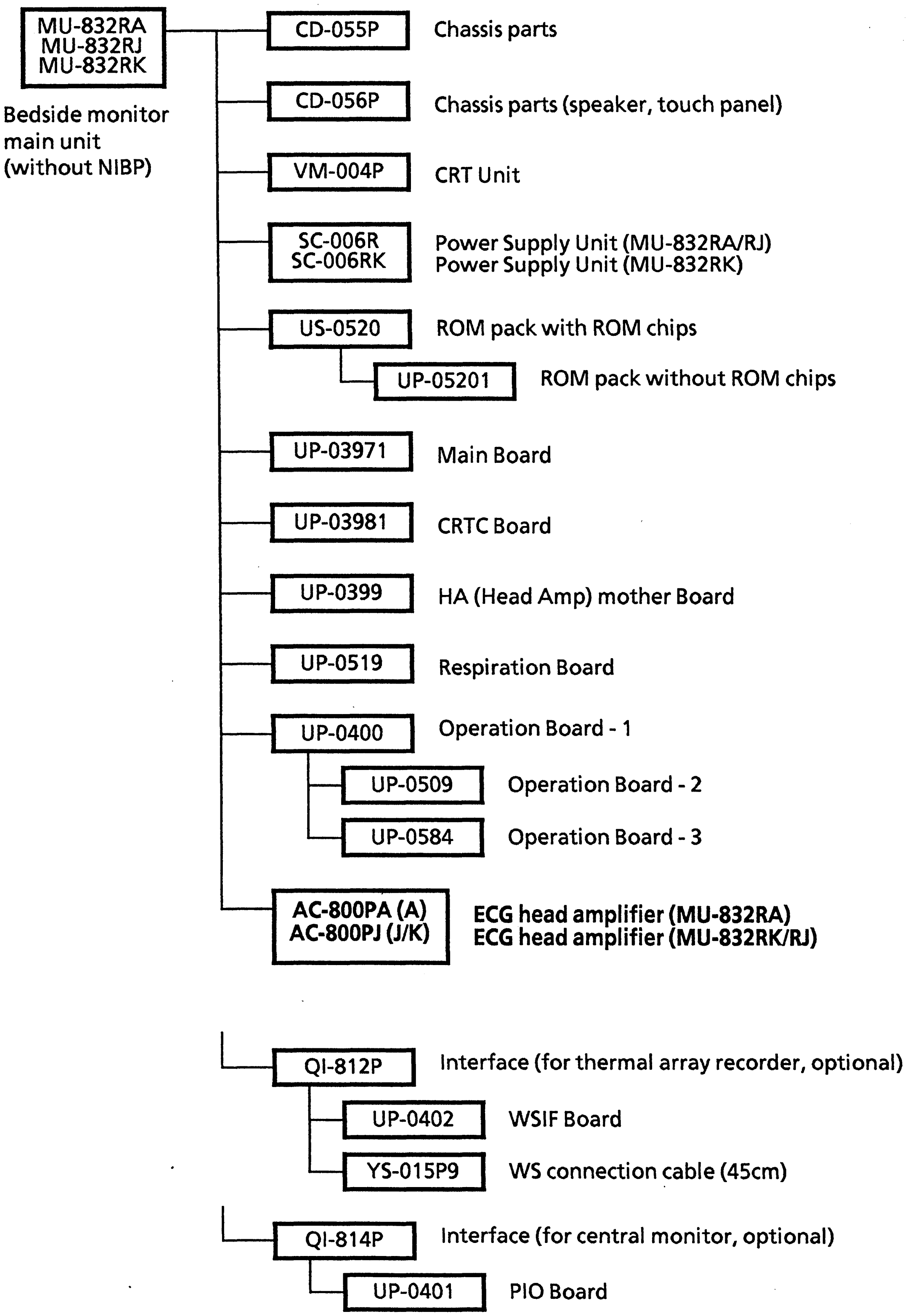

MU-831RA
MU-831RJ
MU-831RK
Bedside monitor main unit (with NIBP)
CD-055P Chassis parts
CD-056P Chassis parts (speaker, touch panel)
VM-004P CRT Unit
SC-006R Power Supply Unit (MU-831RA/RJ)
SC-006RK Power Supply Unit (MU-831RK)
US-0520 ROM pack with ROM chips
UP-05201 ROM pack without ROM chips
UP-03971 Main Board
UP-03981 CRTC Board
UP-0399 HA (Head Amp) mother Board
UP-0519 Respiration Board
UP-0400 Operation Board - 1
UP-0509 Operation Board - 2
UP-0584 Operation Board - 3
AC-800PA (A) ECG head amplifier (MU-831RA)
AC-800PJ (J/K) ECG head amplifier (MU-831RK/RJ)
AP-712P NIBP Unit
QI-812P Interface (for thermal array recorder, optional)
UP-0402 WSIF Board
YS-015P9 WS connection cable (45cm)
QI-814P Interface (for central monitor, optional)
UP-0401 PIO Board

TO

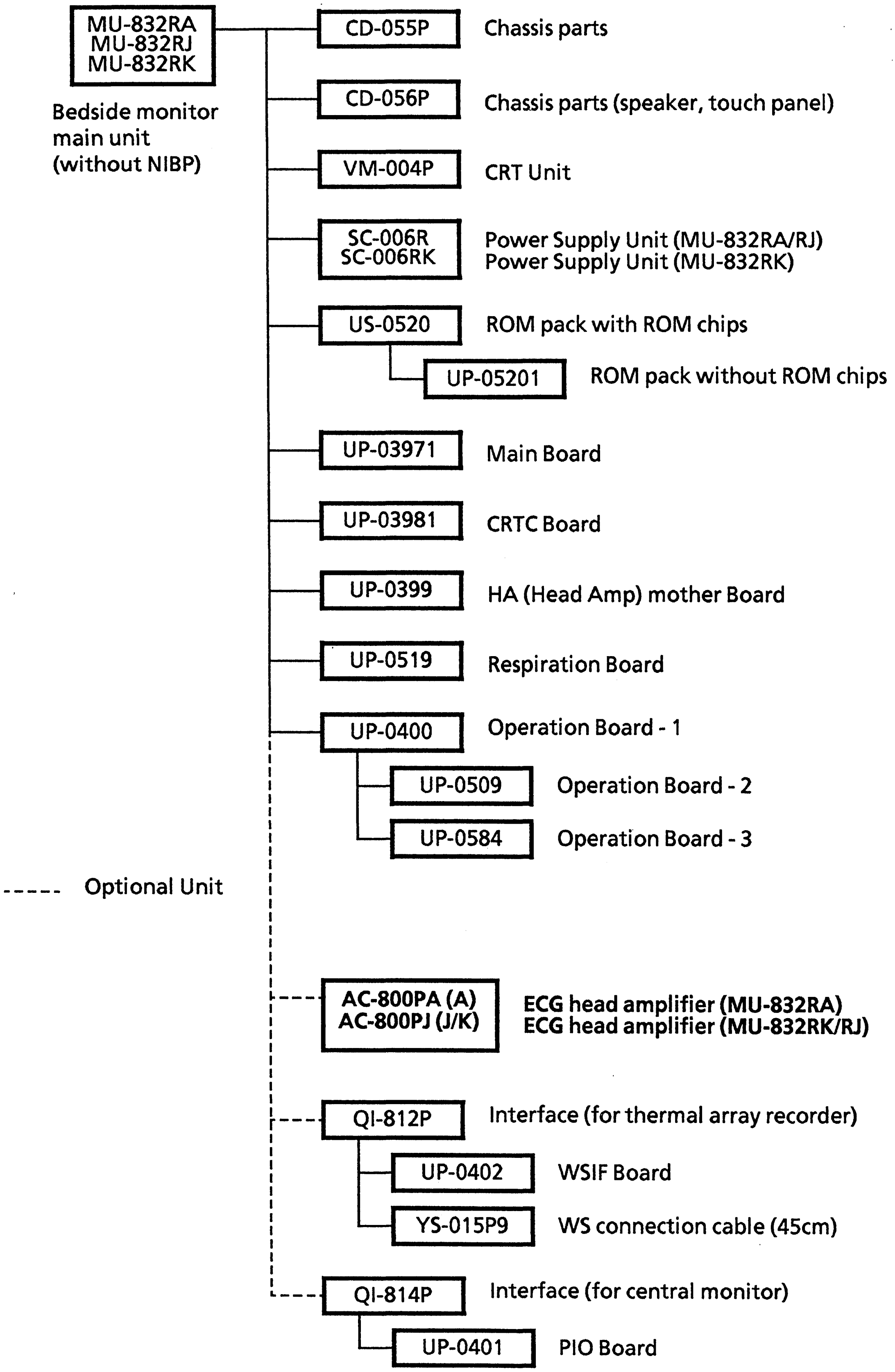

MU-831RA
MU-831RJ
MU-831RK
Bedside monitor main unit (with NIBP)
CD-055P
Chassis parts
CD-056P
Chassis parts (speaker, touch panel)
VM-004P
CRT Unit
SC-006R
SC-006RK
Power Supply Unit (MU-831RA/RJ)
Power Supply Unit (MU-831RK)
US-0520
ROM pack with ROM chips
UP-05201
ROM pack without ROM chips
UP-03971
Main Board
UP-03981
CRTC Board
UP-0399
HA (Head Amp) mother Board
UP-0519
Respiration Board
UP-0400
Operation Board - 1
UP-0509
Operation Board - 2
UP-0584
Operation Board - 3
AP-712P
NIBP Unit
----- Optional Unit
AC-800PA (A)
AC-800PJ (J/K)
ECG head amplifier (MU-831RA)
ECG head amplifier (MU-831RK/RJ)
QI-812P
Interface (for thermal array recorder)
UP-0402
WSIF Board
YS-015P9
WS connection cable (45cm)
QI-814P
Interface (for central monitor)
UP-0401
PIO Board

2) System Composition-2 (Page 1-3)

FROM


MU-832RA
MU-832RJ
MU-832RK
Bedside monitor main unit (without NIBP)
CD-055P
Chassis parts
CD-056P
Chassis parts (speaker, touch panel)
VM-004P
CRT Unit
SC-006R
SC-006RK
Power Supply Unit (MU-832RA/RJ)
Power Supply Unit (MU-832RK)
US-0520
ROM pack with ROM chips
UP-05201
ROM pack without ROM chips
UP-03971
Main Board
UP-03981
CRTC Board
UP-0399
HA (Head Amp) mother Board
UP-0519
Respiration Board
UP-0400
Operation Board - 1
UP-0509
Operation Board - 2
UP-0584
Operation Board - 3
AC-800PA (A)
AC-800PJ (J/K)
ECG head amplifier (MU-832RA)
ECG head amplifier (MU-832RK/RJ)
QI-812P
Interface (for thermal array recorder, optional)
UP-0402
WSIF Board
YS-015P9
WS connection cable (45cm)
QI-814P
Interface (for central monitor, optional)
UP-0401
PIO Board

TO


MU-832RA
MU-832RJ
MU-832RK
Bedside monitor main unit (without NIBP)
CD-055P
Chassis parts
CD-056P
Chassis parts (speaker, touch panel)
VM-004P
CRT Unit
SC-006R
SC-006RK
Power Supply Unit (MU-832RA/RJ)
Power Supply Unit (MU-832RK)
US-0520
ROM pack with ROM chips
UP-05201
ROM pack without ROM chips
UP-03971
Main Board
UP-03981
CRTC Board
UP-0399
HA (Head Amp) mother Board
UP-0519
Respiration Board
UP-0400
Operation Board - 1
UP-0509
Operation Board - 2
UP-0584
Operation Board - 3
----- Optional Unit
AC-800PA (A)
AC-800PJ (J/K)
ECG head amplifier (MU-832RA)
ECG head amplifier (MU-832RK/RJ)
QI-812P
Interface (for thermal array recorder)
UP-0402
WSIF Board
YS-015P9
WS connection cable (45cm)
QI-814P
Interface (for central monitor)
UP-0401
PIO Board

0634-000059B

MANUAL CHANGE INFORMATION

Model	Main Unit	Starting Serial No.	Software Revision	Hardware Revision
BSM-8301A/J/K	MU-831RA	01046	A3-01	C0
	MU-831RJ	00111	A3-01	C0
	MU-831RK	00831	A3-01	D0
BSM-8302A/J/K	MU-832RA	00103	A3-01	C0
	MU-832RJ	00181	A3-01	C0
	MU-832RK	00231	A3-01	C0

The following boards are changed:

Board	From	To
MAIN	UP-0397	UP-03971
CRTC	UP-0398	UP-03981
ROM PACK	UP-0520	UP-05201

The above boards are upgraded when modifications are made to the following boards.

1 CRTC Board UP-03981

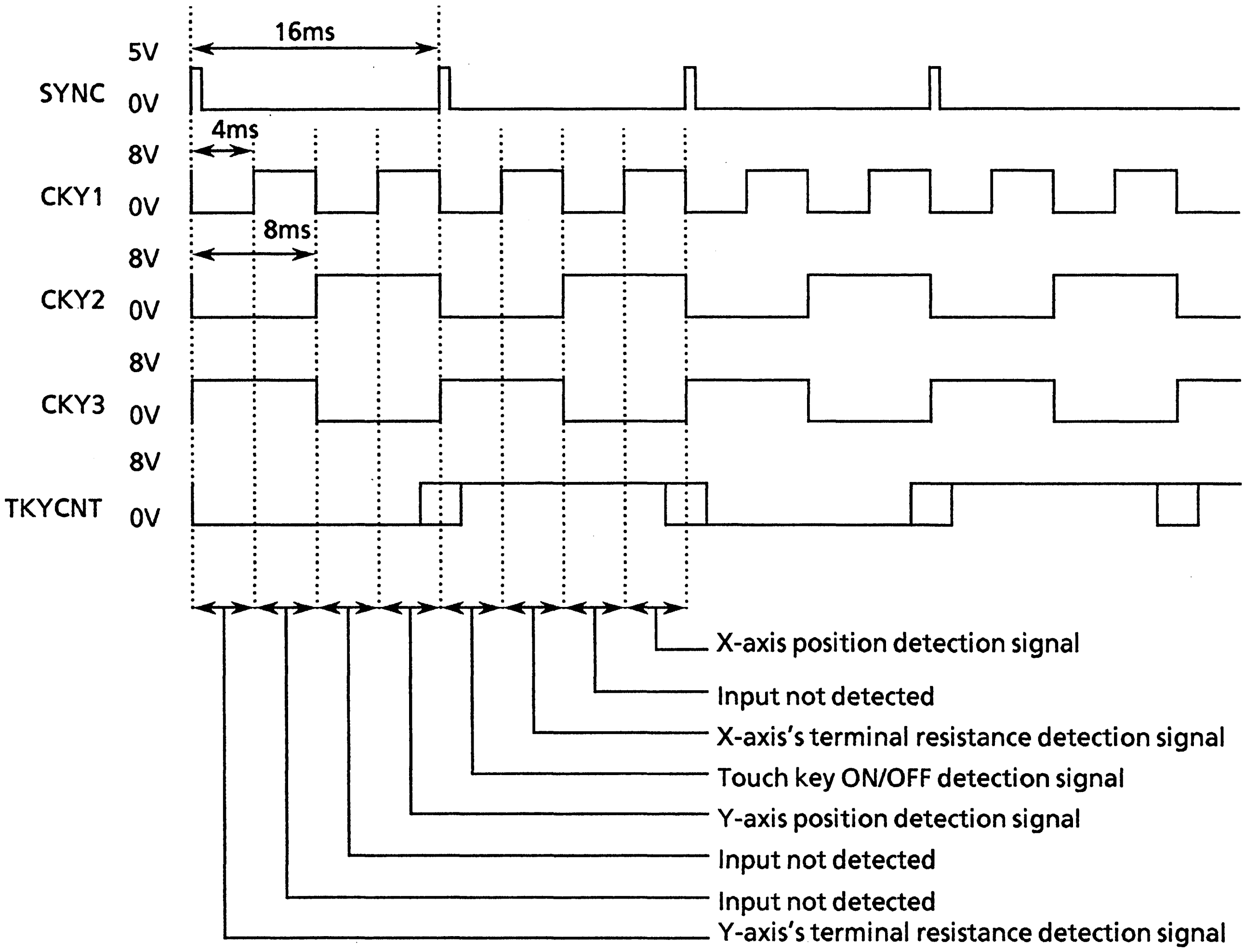
The circuit that accept external video signals and the related synchronized signals is deleted in this modified CRTC board. This function was not used.

2 MAIN Board UP-03971

2.1 Touch-key interface unit

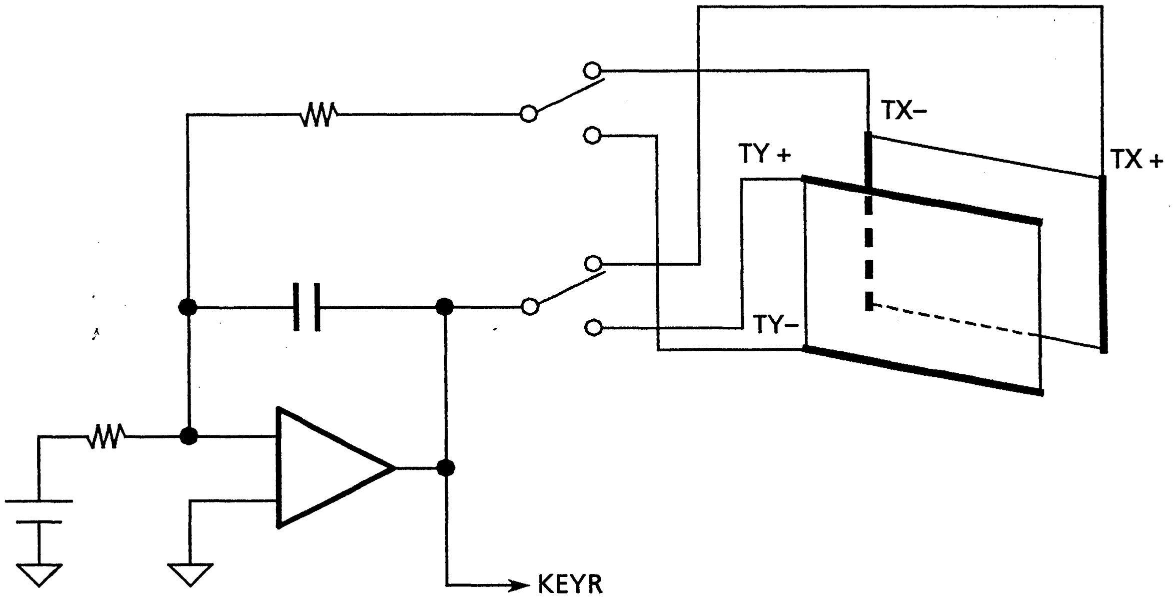
The touch-key operation is not changed. The touch position detection timing is changed from software control to hardware control. This is to incorporate the change in resistance between the terminals of the touch screen transparent electrodes due to aging.

Now the touch-key detected position and the touch screen transparent electrodes's terminal detected resistance value are time-shared as shown in the following time-chart:


16ms
5V
SYNC
0V
4ms
8V
CKY1
0V
8ms
8V
CKY2
0V
8V
CKY3
0V
8V
TKYCNT
0V
X-axis position detection signal
Input not detected
X-axis's terminal resistance detection signal
Touch key ON/OFF detection signal
Y-axis position detection signal
Input not detected
Input not detected
Y-axis's terminal resistance detection signal

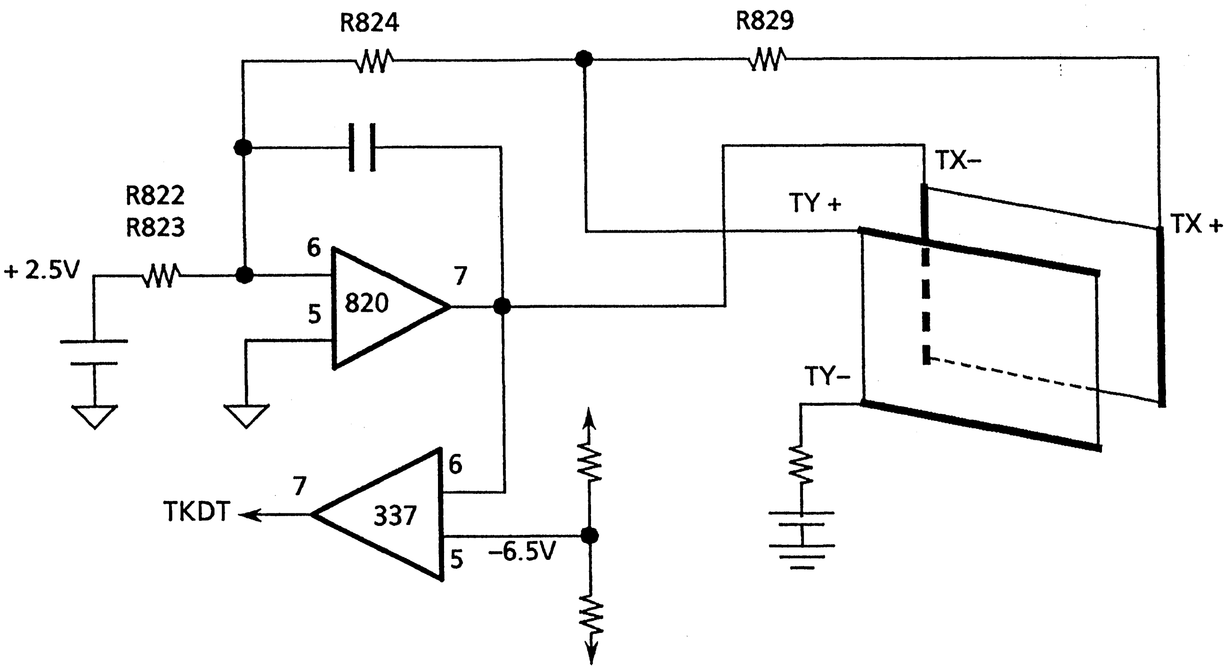
Signal CKY2 and CKY3 contain the time-shared information for touch position and its corresponding voltage between the terminals of the touch screen transparent electrodes. Signal TKYCONT is the same as the previous X/XY signal. The value of the X-axis and the value of the Y-axis are time-shared in this signal. Signal CKY1 determine whether the touch screen is being used or not.

Resistance between the terminals of the touch screen transparent electrodes.



The resistance of the touch screen transparent electrodes changes with time. This causes the calculation of the position of the touched screen to be inaccurate. To offset this effect the fabove circuit is used. This circuit periodically measure the resistance of the touch screen transparent electodes. The CPU then used the value of this resistance to calculate the actual position where contact has been made on the screen. The signal carrying the value of this resistance is called KEYR.

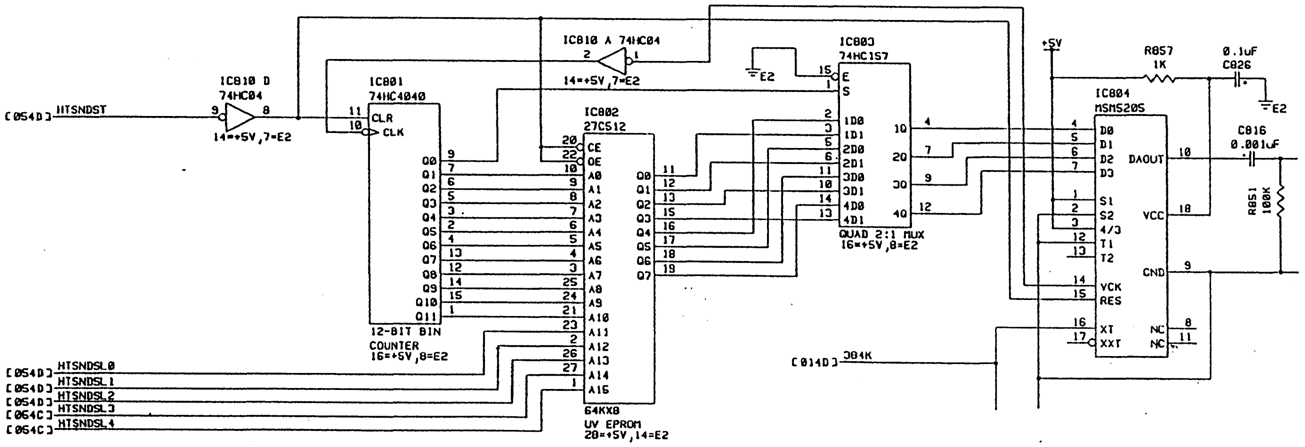
Touch Screen Key Touch Detector


R824
R829
R822
R823
+2.5V
6
5
820
7
TX-
TY +
TX +
TY-
TKDT
7
337
6
5
-6.5V

The resistance of the touch screen transparent electrodes changes when the screen is touched and released. The change in resistance causes the output voltage of the operational amplifier IC820 to change. This output voltage in turn causes the IC337 to release a signal with different voltage. This signal is known as touch screen key touch detection signal (TKDT).

2.2 Sound Unit

Modification is made on this unit to accommodate the change in tone caused by differrent SaO2 values. The previous unit had only one tone represented by the 3 bit HTSNDST signals. The modified unit has a maximum of 32 different tones represented by the 5 bit HTSNDST signals. Pin No.1 and 27 of IC802 are used for the additional 2 bit HTSNDST signals.


IC810 A 74HC04
IC810 D 74HC04
14=+5V,7=E2
HTSNDST
IC801 74HC4040
CLR
CLK
12-BIT BIN COUNTER 16=+5V,8=E2
IC802 27C512
CE
OE
64KX8 UV EPROM 28=+5V,14=E2
IC803 74HC157
QUAD 2:1 MUX 16=+5V,8=E2
IC804 MSM5205
DAOUT
VCC
GND
VCK
RES
XT
XXT
R857 1K
0.1uF C826
C816 0.001uF
R851 100K
+5V
E2
384K
HTSNDSL0
HTSNDSL1
HTSNDSL2
HTSNDSL3
HTSNDSL4

2.3 EMC Filter

This filter is added to decrease the EMC noise. The following filters, capacitors and resistors are changed as follow.

Board	Changed
Main	L004 ~ L006, L101, L102, L705, L706
CRTC	L102, L107, L108, C211 ~ C221, R223, R224, R229 ~ R237

3 ROM PACK Board UP-05201

This board is only upgraded. There are no change in functions and parts on this board.

4 Electrical Part List

The electrtical part list of the changed boards in the service manual (from page 9-3 to 9-13) are changed as follow.

UP-03971 MAIN BD

ASSY	CKT NO.	PART NO.	QTY	DESCRIPTION
UP-03971		105842	1	BATT CR17335SE-T-C7 Lithium 3V
UP-03971		356598	2	CN AXS202811(u-IC SOCKET 28pin)
UP-03971	C001	046861	1	EECF5R5U105 1F/5.5V
UP-03971	C010-C012	159632	3	TAC 267M2002 106MR533 10uF20V
UP-03971	C013-C014	159695	2	TAC 267M3502 106MR720 10uF35V
UP-03971	C015-C016	159703	2	CEC ECUY1H 104ZFG 0.1uF50V
UP-03971	C020-C074	159703	55	CEC ECUY1H 104ZFG 0.1uF50V
UP-03971	C101	159641	1	TAC 267M2002 226MR533 22uF20V
UP-03971	C102	159703	1	CEC ECUY1H 104ZFG 0.1uF50V
UP-03971	C103	159632	1	TAC 267M2002 106MR533 10uF20V
UP-03971	C104	159721	1	CEC GRM39SL 220K50PT 50V 22pF
UP-03971	C105	159632	1	TAC 267M2002 106MR533 10uF20V
UP-03971	C106-C108	159703	3	CEC ECUY1H 104ZFG 0.1uF50V
UP-03971	C110	159748	1	CEC GRM39SL 470K50PT 50V 47pF
UP-03971	C121	159748	1	CEC GRM39SL 470K50PT 50V 47pF
UP-03971	C122	159766	1	CEC GRM39SL 101K50PT 100pF50V
UP-03971	C301	159703	1	CEC ECUY1H 104ZFG 0.1uF50V
UP-03971	C302-C303	159632	2	TAC 267M2002 106MR533 10uF20V
UP-03971	C304	159703	1	CEC ECUY1H 104ZFG 0.1uF50V
UP-03971	C305	159632	1	TAC 267M2002 106MR533 10uF20V
UP-03971	C306-C308	159703	3	CEC ECUY1H 104ZFG 0.1uF50V
UP-03971	C309	043543	1	FLC ECQP1H102JZ 1000pF
UP-03971	C310	159748	1	CEC GRM39SL 470K50PT 50V 47pF
UP-03971	C311-C316	159703	6	CEC ECUY1H 104ZFG 0.1uF50V
UP-03971	C317	341471	1	FLC ECW-U1H473JA5 50V 0.047uF
UP-03971	C318	341462	1	FLC ECW-U1H333JA5 50V 0.033uF
UP-03971	C319	159784	1	CEC GRM39SL 331K50PT 330pF50V
UP-03971	C320	159703	1	CEC ECUY1H 104ZFG 0.1uF50V
UP-03971	C330-C331	159695	2	TAC 267M3502 106MR720 10uF35V
UP-03971	C332-C333	159703	2	CEC ECUY1H 104ZFG 0.1uF50V
UP-03971	C334-C335	159784	2	CEC GRM39SL 331K50PT 330pF50V
UP-03971	C401-C404	331134	4	FLC ECW-U1H103JA5 50V 0.01uF
UP-03971	C405	341471	1	FLC ECW-U1H473JA5 50V 0.047uF
UP-03971	C406-C407	331072	2	FLC ECW-U1H102JA5 50V 0.001uF
UP-03971	C408	331054	1	FLC ECW-U1H682JA5 50V 0.0068uF
UP-03971	C409	339607	1	FLC ECW-U1H222JA5 50V 0.0022uF
UP-03971	C410	331054	1	FLC ECW-U1H682JA5 50V 0.0068uF
UP-03971	C411	339607	1	FLC ECW-U1H222JA5 50V 0.0022uF
UP-03971	C412	341471	1	FLC ECW-U1H473JA5 50V 0.047uF
UP-03971	C451	339607	1	FLC ECW-U1H222JA5 50V 0.0022uF
UP-03971	C452-C455	159632	4	TAC 267M2002 106MR533 10uF20V
UP-03971	C456	331072	1	FLC ECW-U1H102JA5 50V 0.001uF
UP-03971	C457-C459	341471	3	FLC ECW-U1H473JA5 50V 0.047uF
UP-03971	C460-C461	159659	2	TAC 267M3502 105MR 1uF35V
UP-03971	C501	339607	1	FLC ECW-U1H222JA5 50V 0.0022uF
UP-03971	C502-C505	159632	4	TAC 267M2002 106MR533 10uF20V
UP-03971	C506	331072	1	FLC ECW-U1H102JA5 50V 0.001uF
UP-03971	C507-C509	341471	3	FLC ECW-U1H473JA5 50V 0.047uF
UP-03971	C510-C511	159659	2	TAC 267M3502 105MR 1uF35V
UP-03971	C701-C702	341471	2	FLC ECW-U1H473JA5 50V 0.047uF
UP-03971	C704	159632	1	TAC 267M2002 106MR533 10uF20V
UP-03971	C705-C706	159703	2	CEC ECUY1H 104ZFG 0.1uF50V
UP-03971	C707	159632	1	TAC 267M2002 106MR533 10uF20V
UP-03971	C709	159703	1	CEC ECUY1H 104ZFG 0.1uF50V
UP-03971	C710-C711	159632	2	TAC 267M2002 106MR533 10uF20V
UP-03971	C712	159703	1	CEC ECUY1H 104ZFG 0.1uF50V
UP-03971	C713-C714	159632	2	TAC 267M2002 106MR533 10uF20V
UP-03971	C715	159784	1	CEC GRM39SL 331K50PT 330pF50V
UP-03971	C716-C718	159748	3	CEC GRM39SL 470K50PT 50V 47pF
UP-03971	C719-C720	159632	2	TAC 267M2002 106MR533 10uF20V
UP-03971	C721	159695	1	TAC 267M3502 106MR720 10uF35V
UP-03971	C722-C724	159748	3	CEC GRM39SL 470K50PT 50V 47pF
UP-03971	C725-C726	159721	2	CEC GRM39SL 220K50PT 50V 22pF
UP-03971	C727	159766	1	CEC GRM39SL 101K50PT 100pF50V
UP-03971	C801-C804	339607	4	FLC ECW-U1H222JA5 50V 0.0022uF
UP-03971	C805-C806	331134	2	FLC ECW-U1H103JA5 50V 0.01uF
UP-03971	C816-C817	331072	2	FLC ECW-U1H102JA5 50V 0.001uF
UP-03971	C822-C824	331134	3	FLC ECW-U1H103JA5 50V 0.01uF
UP-03971	C826-C827	159703	2	CEC ECUY1H 104ZFG 0.1uF50V
UP-03971	D101	160087	1	D 1SS307 TE85R
UP-03971	D102	003667	1	D HP5082-2835
UP-03971	D103	160104	1	D HSM123 TR
UP-03971	D301	160104	1	D HSM123 TR
UP-03971	D303-D305	160078	3	D HSK120TR
UP-03971	D401-D404	160087	4	D 1SS307 TE85R
UP-03971	D451-D452	071495	2	D 1SS106TE
UP-03971	D453-D454	160078	2	D HSK120TR
UP-03971	D501-D502	071495	2	D 1SS106TE
UP-03971	D503-D504	160078	2	D HSK120TR
UP-03971	D701-D703	160104	3	D HSM123 TR
UP-03971	D801	160078	1	D HSK120TR
UP-03971	IC101	365258	1	CMOS 74AC161SJ
UP-03971	IC102	161692	1	ADIC TL7705ACPS
UP-03971	IC103	160817	1	CMOS MC14538BF
UP-03971	IC104	161273	1	CMOS HD74HC148FP
UP-03971	IC105	365294	1	CPU HD68HC000CP12 PLCC
UP-03971	IC106	333694	1	TTL SN74LS07
UP-03971	IC107	365222	1	CMOS 74AC10SJ
UP-03971	IC108	323054	1	CMOS HD74HC393FP

ASSY	CKT NO.	PART NO.	QTY	DESCRIPTION
UP-03971	IC109	333836	1	CMOS 74AC04SJ
UP-03971	IC111	365204	1	CMOS 74AC00SJ
UP-03971	IC112	333845	1	CMOS 74AC139SJ
UP-03971	IC113	161709	1	CMOS 74AC138SJ
UP-03971	IC115	161709	1	CMOS 74AC138SJ
UP-03971	IC117	161709	1	CMOS 74AC138SJ
UP-03971	IC118	357418	1	CMOS HD74AC164FP
UP-03971	IC119	333845	1	CMOS 74AC139SJ
UP-03971	IC121	333827	1	CMOS 74AC32SJ
UP-03971	IC128-IC129	348205	2	RAM HM628128LFP-8
UP-03971	IC136	333854	1	CMOS 74AC244SJ
UP-03971	IC137	365302	1	CPU TMP82C51AM-10(CELZ
UP-03971	IC138	333854	1	CMOS 74AC244SJ
UP-03971	IC139	333702	1	CMOS HD74HC273FP
UP-03971	IC140	323179	1	CPU MSM6242GS-VK
UP-03971	IC141	323188	1	CPU HM58C65FP-25
UP-03971	IC142	365204	1	CMOS 74AC00SJ
UP-03971	IC143	161237	1	CMOS HD74HC390FP
UP-03971	IC144	334042	1	CMOS HD74AC125FP
UP-03971	IC145	161112	1	CMOS HD74HC174FP
UP-03971	IC151-IC153	149937A	3	CMOS 74AC373SJ(CD74AC373M) SOP
UP-03971	IC154-IC155	357454	2	CMOS TC74AC245F
UP-03971	IC156	333836	1	CMOS 74AC04SJ
UP-03971	IC157-IC159	149901A	3	CMOS 74AC74SJ(CD74AC74M) (SOP)
UP-03971	IC161-IC166	357454	6	CMOS TC74AC245F
UP-03971	IC167	365249	1	CMOS 74AC86SJ
UP-03971	IC301	160568	1	CMOS MC14051BF
UP-03971	IC302	160265	1	OPIC uPC812G2
UP-03971	IC303	160568	1	CMOS MC14051BF
UP-03971	IC304	015886	1	IC UPC-649C
UP-03971	IC305	160265	1	OPIC uPC812G2
UP-03971	IC306	016653	1	ADIC ADC574AJH 12BITADC
UP-03971	IC307	333702	1	CMOS HD74HC273FP
UP-03971	IC308	161282	1	CMOS MC14504BF
UP-03971	IC309	333854	1	CMOS 74AC244SJ
UP-03971	IC310	160871	1	CMOS HD74HC04FP
UP-03971	IC311	333854	1	CMOS 74AC244SJ
UP-03971	IC313	160978	1	CMOS HD74HC74FP
UP-03971	IC315-IC316	333702	2	CMOS HD74HC273FP
UP-03971	IC317	016092	1	ADIC HA-17012PB 12BIT DA
UP-03971	IC318	160265	1	OPIC uPC812G2
UP-03971	IC324	160407	1	REG LT1009S8
UP-03971	IC328	333702	1	CMOS HD74HC273FP
UP-03971	IC331-IC332	161282	2	CMOS MC14504BF
UP-03971	IC335	323099	1	OPIC uPC458G2
UP-03971	IC337	160309	1	ADIC HA17903FP
UP-03971	IC338	161095	1	CMOS HD74HC164FP
UP-03971	IC340	160853	1	CMOS HD74HC00FP
UP-03971	IC341	015814	1	REG uPC7812H Regulator
UP-03971	IC342	015841	1	REG UPC7912H
UP-03971	IC401-IC405	160265	5	OPIC uPC812G2
UP-03971	IC406-IC407	160586	2	CMOS MC14053BF
UP-03971	IC408-IC409	160265	2	OPIC uPC812G2
UP-03971	IC411	160586	1	CMOS MC14053BF
UP-03971	IC451-IC452	160265	2	OPIC uPC812G2
UP-03971	IC453	160586	1	CMOS MC14053BF
UP-03971	IC454	160256	1	OPIC uPC811G2
UP-03971	IC502	160265	1	OPIC uPC812G2
UP-03971	IC503	160586	1	CMOS MC14053BF
UP-03971	IC504	160256	1	OPIC uPC811G2
UP-03971	IC701	160265	1	OPIC uPC812G2
UP-03971	IC702	161282	1	CMOS MC14504BF
UP-03971	IC703-IC704	333694	2	TTL SN74LS07
UP-03971	IC705	160871	1	CMOS HD74HC04FP
UP-03971	IC706	160586	1	CMOS MC14053BF
UP-03971	IC707	160265	1	OPIC uPC812G2
UP-03971	IC708	160568	1	CMOS MC14051BF
UP-03971	IC709	015823	1	REG uPC7815H Regulator
UP-03971	IC710	160265	1	OPIC uPC812G2
UP-03971	IC711	160586	1	CMOS MC14053BF
UP-03971	IC712	160309	1	ADIC HA17903FP
UP-03971	IC713	160586	1	CMOS MC14053BF
UP-03971	IC714	160871	1	CMOS HD74HC04FP
UP-03971	IC716-IC719	161291	4	CMOS uPD74HC4094GS
UP-03971	IC720-IC723	161754	4	CMOS HD74HC597FP
UP-03971	IC724	161086	1	CMOS HD74HC161FP
UP-03971	IC725	161264	1	CMOS HD74HC4040FP
UP-03971	IC726	160978	1	CMOS HD74HC74FP
UP-03971	IC727	160862	1	CMOS HD74HC02FP
UP-03971	IC729	333702	1	CMOS HD74HC273FP
UP-03971	IC730-IC731	160978	2	CMOS HD74HC74FP
UP-03971	IC732	161237	1	CMOS HD74HC390FP
UP-03971	IC733	161068	1	CMOS HD74HC157FP
UP-03971	IC801	161264	1	CMOS HD74HC4040FP
UP-03971	IC803	161068	1	CMOS HD74HC157FP
UP-03971	IC804	016475	1	ADIC MSM5205RS
UP-03971	IC805	161264	1	CMOS HD74HC4040FP
UP-03971	IC807	161068	1	CMOS HD74HC157FP
UP-03971	IC808	016475	1	ADIC MSM5205RS
UP-03971	IC809	333854	1	CMOS 74AC244SJ
UP-03971	IC810	160871	1	CMOS HD74HC04FP
UP-03971	IC811-IC812	161086	2	CMOS HD74HC161FP

ASSY	CKT NO.	PART NO.	QTY	DESCRIPTION
UP-03971	IC814	160265	1	OPIC uPC812G2
UP-03971	IC815	160853	1	CMOS HD74HC00FP
UP-03971	IC816	160265	1	OPIC uPC812G2
UP-03971	IC817	333827	1	CMOS 74AC32SJ
UP-03971	IC820-IC821	160265	2	OPIC uPC812G2
UP-03971	IC822-IC824	160586	3	CMOS MC14053BF
UP-03971	J001	091437	1	PCN FFC-34BSM1#2
UP-03971	J005	091152	1	PCN PS-22PLB-D4LT1-FL
UP-03971	J006	083339	1	PCN 171363-1 17pin male
UP-03971	J007-J009	089966	3	PCN PCN10EA-90S-2.54DSA(05)
UP-03971	J010	365178	1	PCN PCN10EA-64S-2.54DS(05)
UP-03971	J011	092864	1	PCN IL-2P-S3FP2-1
UP-03971	L001-L003	024243	3	NFLT BNX002-01 DC Line Filter
UP-03971	L004-L006	367381	3	NFLT NFM61R30T472T1
UP-03971	L101	341489	1	NFLT BLM21A05PT
UP-03971	L102	367381	1	NFLT NFM61R30T472T1
UP-03971	L704-L705	367381	2	NFLT NFM61R30T472T1
UP-03971	Q101	160122	1	TR 2SA1122 CORD TR
UP-03971	Q102	160149	1	TR 2SC2618 D TR
UP-03971	Q701	160122	1	TR 2SA1122 CORD TR
UP-03971	Q702	160149	1	TR 2SC2618 D TR
UP-03971	R101	159561	1	MR RK73K1JTD0 47KohmJ 1/16W
UP-03971	R105	159561	1	MR RK73K1JTD0 47KohmJ 1/16W
UP-03971	R106	351834	1	MR RK73K1JTD0 100ohmJ 1/16W
UP-03971	R125-R126	351834	2	MR RK73K1JTD0 100ohmJ 1/16W
UP-03971	R304-R305	365187	2	MR RN73C2BTD 1.000Kohm B 1/8W
UP-03971	R331	159561	1	MR RK73K1JTD0 47KohmJ 1/16W
UP-03971	VC101	047637	1	VC TZ03R 300ER 5.2-30pF
UP-03971	VR301	159846	1	POT G4AT 1Kohm
UP-03971	VR302-VR303	159819	2	POT G4AT 100ohm
UP-03971	VR304	159828	1	POT G4AT 200ohm
UP-03971	VR305	159873	1	POT G4AT 10Kohm
UP-03971	VR451	159882	1	POT G4AT 20Kohm
UP-03971	VR452	159873	1	POT G4AT 10Kohm
UP-03971	VR501	159882	1	POT G4AT 20Kohm
UP-03971	VR502	159873	1	POT G4AT 10Kohm
UP-03971	VR701	159837	1	POT G4AT 500ohm
UP-03971	X101	022931	1	XTAL KF-38G

ASSY	CKT NO.	PART NO.	QTY	DESCRIPTION
UP-03981 CRTC BD				
UP-03981		086185	1	CN IC SOCKET DL-2-20A (01)
UP-03981	CNJ101	089957	1	PCN PCN10EA-90P-2.54DS(05)
UP-03981	CNJ102	081109	1	CN RDBD-25SE-LNA FEMALE
UP-03981	CNJ103	089699	1	PCN M60-12-30-114P (12P Straight)
UP-03981	CNJ105	089912	1	PCN PCN10EA-32P-2.54DS(05)
UP-03981	CNJ107	090705	1	PCN PS-20PLB-D4T1-FL1
UP-03981	CNJ108	089663	1	PCN M60-03-30-114P (3P Straight)
UP-03981	C010-C014	159784	5	CEC GRM39SL 331K50PT 330pF50V
UP-03981	C101-C102	159632	2	TAC 267M2002 106MR533 10uF20V
UP-03981	C103-C111	159659	9	TAC 267M3502 105MR 1uF35V
UP-03981	C112-C202	159703	91	CEC ECUY1H 104ZFG 0.1uF50V
UP-03981	C203-C204	159766	2	CEC GRM39SL 101K50PT 100pF50V
UP-03981	C211-C214	159721	4	CEC GRM39SL 220K50PT 50V 22pF
UP-03981	C215-C216	159748	2	CEC GRM39SL 470K50PT 50V 47pF
UP-03981	C217	159703	1	CEC ECUY1H 104ZFG 0.1uF50V
UP-03981	C301-C303	159632	3	TAC 267M2002 106MR533 10uF20V
UP-03981	C304	159721	1	CEC GRM39SL 220K50PT 50V 22pF
UP-03981	C305	070317	1	EC ECEA1VU 101B (100uF/35V)
UP-03981	C306	331107	1	FLC ECW-U1H223JA5 50V 0.022uF
UP-03981	C307	070317	1	EC ECEA1VU 101B (100uF/35V)
UP-03981	C308	159632	1	TAC 267M2002 106MR533 10uF20V
UP-03981	C309	159721	1	CEC GRM39SL 220K50PT 50V 22pF
UP-03981	C310	070317	1	EC ECEA1VU 101B (100uF/35V)
UP-03981	C311	331107	1	FLC ECW-U1H223JA5 50V 0.022uF
UP-03981	C312	159766	1	CEC GRM39SL 101K50PT 100pF50V
UP-03981	C313	159703	1	CEC ECUY1H 104ZFG 0.1uF50V
UP-03981	C401-C403	040377	3	EC ECES1EU682Q
UP-03981	DL201-DL202	037229	2	COIL JD3010C
UP-03981	DL212-DL213	037265	2	COIL DCS10-10 Delay Line
UP-03981	D101-D129	160104	29	D HSM123 TR
UP-03981	D131	160078	1	D HSK120TR
UP-03981	D201-D216	160104	16	D HSM123 TR
UP-03981	GA101	013754A	1	CPU Gate Array ACW
UP-03981	GA102-GA103	013745A	2	CPU Gate Array DCW
UP-03981	IC101-IC104	333854	4	CMOS 74AC244SJ
UP-03981	IC105	161709	1	CMOS 74AC138SJ
UP-03981	IC106	333863	1	CMOS 74AC08SJ
UP-03981	IC107	333836	1	CMOS 74AC04SJ
UP-03981	IC108	334042	1	CMOS HD74AC125FP
UP-03981	IC109	333774	1	CPU HD63484CP-8
UP-03981	IC110	365285	1	CPU HD63486CP32
UP-03981	IC111	365276	1	CPU HD63485CP32
UP-03981	IC112-IC119	333907	8	RAM HM53461JP-12

ASSY	CKT NO.	PART NO.	QTY	DESCRIPTION
UP-03981	IC120	365213	1	CMOS 74AC02SJ
UP-03981	IC121	365267	1	CMOS TC74AC05F
UP-03981	IC122	333854	1	CMOS 74AC244SJ
UP-03981	IC124	365213	1	CMOS 74AC02SJ
UP-03981	IC201-IC206	357454	6	CMOS TC74AC245F
UP-03981	IC207-IC210	323116	4	CPU HM62256LFP-8T
UP-03981	IC215	333863	1	CMOS 74AC08SJ
UP-03981	IC216-IC217	365231	2	CMOS 74AC158SJ
UP-03981	IC218-IC219	149901A	2	CMOS 74AC74SJ(CD74AC74M) (SOP)
UP-03981	IC220-IC221	333854	2	CMOS 74AC244SJ
UP-03981	IC227	149901A	1	CMOS 74AC74SJ(CD74AC74M) (SOP)
UP-03981	IC228	333854	1	CMOS 74AC244SJ
UP-03981	IC230-IC237	333907	8	RAM HM53461JP-12
UP-03981	IC238-IC239	334069	2	CMOS TC74AC299F
UP-03981	IC240-IC247	333907	8	RAM HM53461JP-12
UP-03981	IC248-IC249	334069	2	CMOS TC74AC299F
UP-03981	IC250-IC257	333907	8	RAM HM53461JP-12
UP-03981	IC258-IC259	334069	2	CMOS TC74AC299F
UP-03981	IC260-IC267	333907	8	RAM HM53461JP-12
UP-03981	IC268-IC269	334069	2	CMOS TC74AC299F
UP-03981	IC270	334033	1	CMOS HD74AC374FP
UP-03981	IC271	333827	1	CMOS 74AC32SJ
UP-03981	IC272	334033	1	CMOS HD74AC374FP
UP-03981	IC301	010801	1	ADIC uPC1316C AUDIO AMP
UP-03981	L101	024243	1	NFLT BNX002-01 DC Line Filter
UP-03981	L102	334149	1	NFLT NFM52R20P506
UP-03981	L107-L108	341489	2	NFLT BLM21A05PT
UP-03981	Q101-Q103	334122A	3	TR 2SC3735-T2B
UP-03981	Q105-Q107	334122A	3	TR 2SC3735-T2B
UP-03981	R223-R224	351834	2	MR RK73K1JTD0 100ohmJ 1/16W
UP-03981	R229-R230	367399	2	MR RK73K1JTD0 10ohmJ 1/16W
UP-03981	R231-R232	351834	2	MR RK73K1JTD0 100ohmJ 1/16W
UP-03981	R236-R237	367399	2	MR RK73K1JTD0 10ohmJ 1/16W
UP-03981	VR101	365196	1	POT G4ST 200Kohm
UP-03981	X101	026259	1	XTAL TD308C 49.152MHZ

5 Circuit Diagram

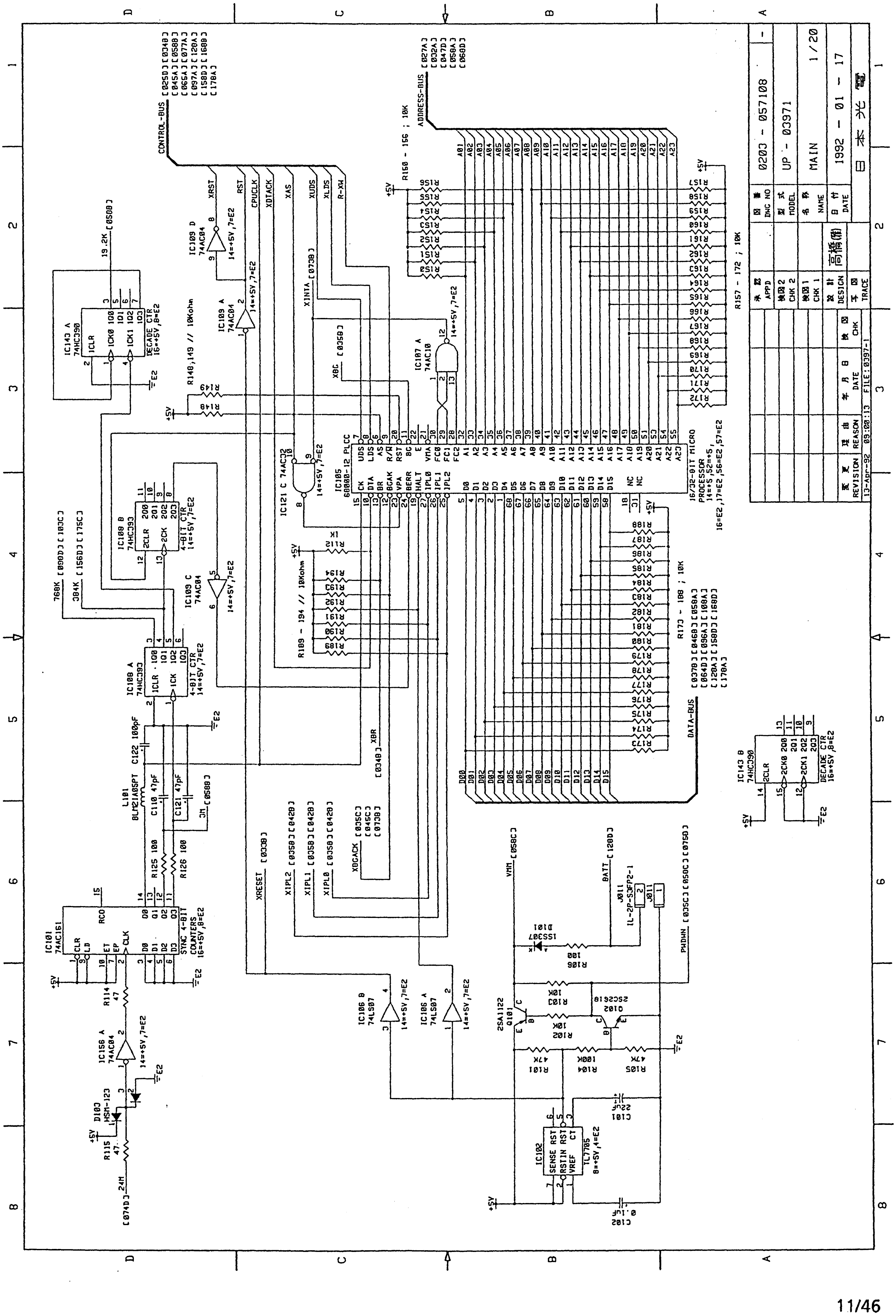
The circuit diagrams in section 10 of the service manual are changed as follow.

Circuit Diagram	From Page	To Page
MAIN	10-4 to 10-22	11/46 to 30/46
ROM PACK	10-23 to 10-24	31/46 to 32/46
CRTC	10-25 to 10-38	33/46 to 46/46

6 Compatibility

Compatibility between the board and the software revision is shown below.

Board	Software Revision	
	Previous	A3-01
UP-0397	Yes	Yes
UP-03971	No	Yes
UP-0398	Yes	Yes
UP-03981	Yes	Yes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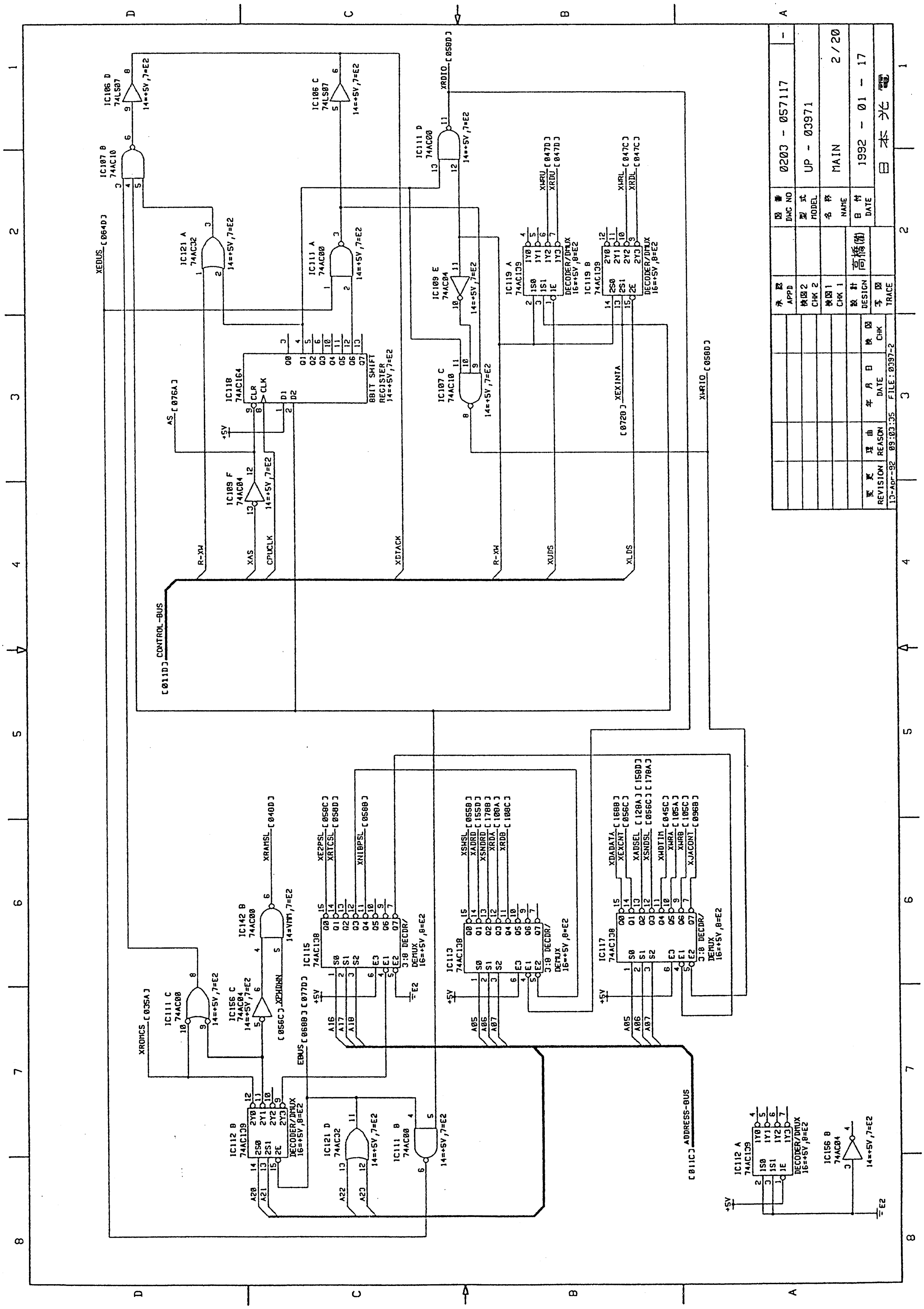
UP - 03971
MAIN
1/20
1992 - 01 - 17
日本光電
高橋
13-Apr-92 09:00:13
FILE:0397-1
IC105 68000-12 PLCC
16/32-BIT MICRO PROCESSOR
CONTROL-BUS
ADDRESS-BUS
DATA-BUS
IC101 74AC161
IC102 TL7705
IC108 A 74HC393
IC108 B 74HC393
IC143 A 74HC390
IC143 B 74HC390
IC109 74AC04
IC121 C 74AC32
IC107 A 74AC10
IC106 74LS07
IC156 A 74AC04
R150 - 156 ; 10K
R157 - 172 ; 10K
R173 - 188 ; 10K
R189 - 194 // 10Kohm
R148,149 // 10Kohm
L101 BLM21A05PT
Q101 2SA1122
Q102 2SC2618
D101 1SS307
D103 HSM-123
J011 IL-2P-S3FP2-1
24M

MANUAL CHANGE INFORMATION



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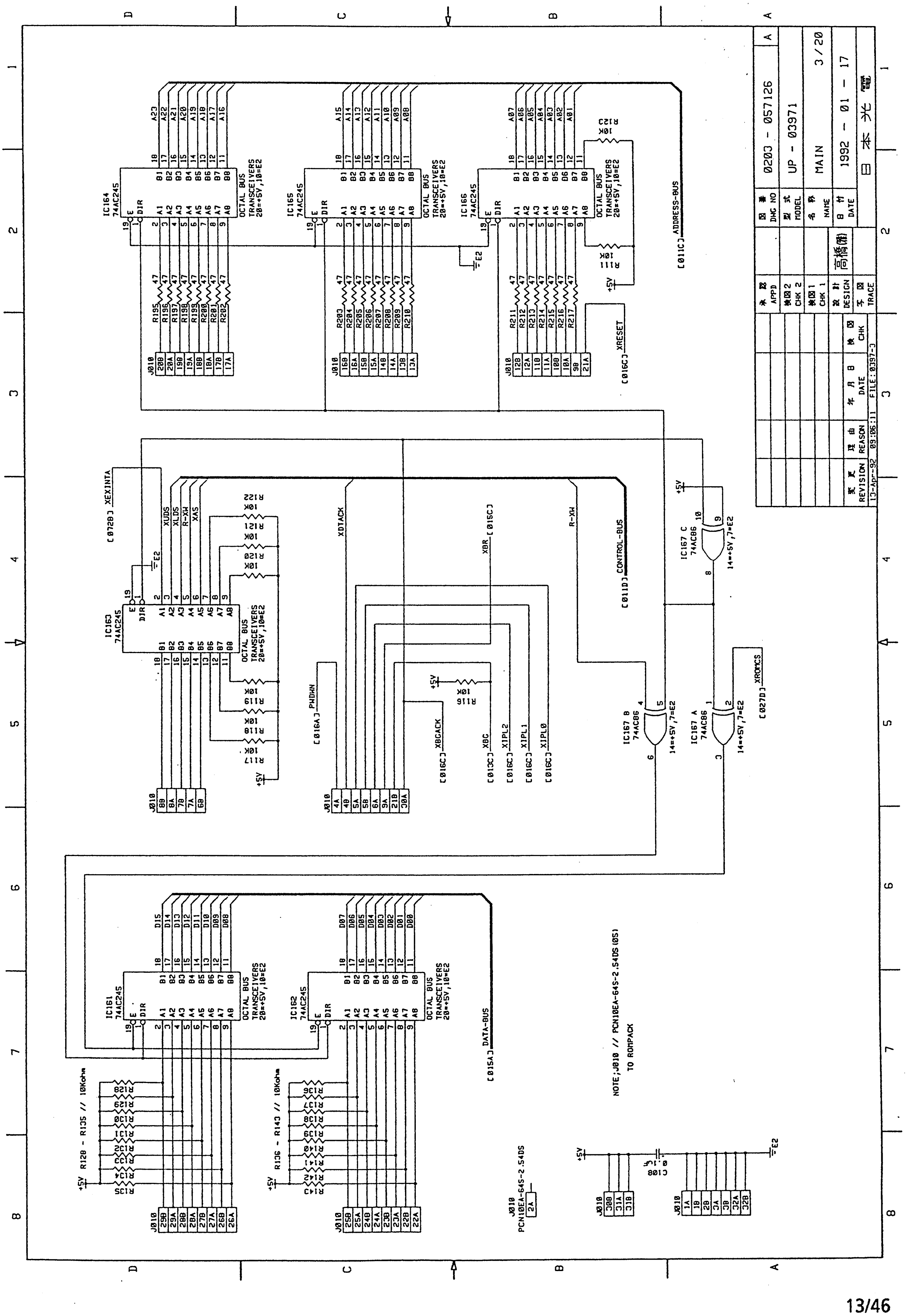
UP - 03971
MAIN
2/20
1992 - 01 - 17
日本光電
DWG NO
MODEL
NAME
DATE
APPD
CHK 2
CHK 1
DESIGN
TRACE
REVISION
REASON
DATE
CHK
13-Apr-92 09:03:35 FILE:0397-2
IC106 D 74LS07
IC106 C 74LS07
IC107 B 74AC10
IC107 C 74AC10
IC111 D 74AC00
IC111 A 74AC00
IC111 C 74AC00
IC111 B 74AC00
IC121 A 74AC32
IC121 D 74AC32
IC109 E 74AC04
IC109 F 74AC04
IC118 74AC164 8BIT SHIFT REGISTER 14=+5V,7=E2
IC119 A 74AC139 DECODER/DMUX 16=+5V,8=E2
IC119 B 74AC139 DECODER/DMUX 16=+5V,8=E2
IC142 B 74AC00
IC156 C 74AC04
IC156 B 74AC04
IC115 74AC138 3:8 DECDR/DEMUX 16=+5V,8=E2
IC113 74AC138 3:8 DECDR/DEMUX 16=+5V,8=E2
IC117 74AC138 3:8 DECDR/DEMUX 16=+5V,8=E2
IC112 B 74AC139 DECODER/DMUX 16=+5V,8=E2
IC112 A 74AC139 DECODER/DMUX 16=+5V,8=E2
XRDIO [058D]
XEDUS [064D]
AS [076A]
XWRU [047D]
XRDU [047D]
XWRL [047C]
XRDL [047C]
XEXINTA [072D]
XWRIO [058D]
R-XW
XAS
CPUCLK
XDTACK
XUDS
XLDS
CONTROL-BUS [011D]
XROMCS [035A]
XPHDWN [056C]
EBUS [068B]
XRAMSL [040D]
XE2PSL [058C]
XRTCSL [058D]
XN10PSL [058B]
XSHSL [055B]
XADRD [155D]
XSNDRD [170B]
XRDA [108A]
XRDB [108C]
XDADATA [168B]
XEXCNT [056C]
XADSEL [120A]
XSNDSL [056C]
XWDTIM [045C]
XWRA [105A]
XWRB [105C]
XJACONT [096B]
A16 A17 A18
A05 A06 A07
A20 A21 A22 A23
ADDRESS-BUS [011C]
+5V
E2
14=+5V,7=E2
A B C D
1 2 3 4 5 6 7 8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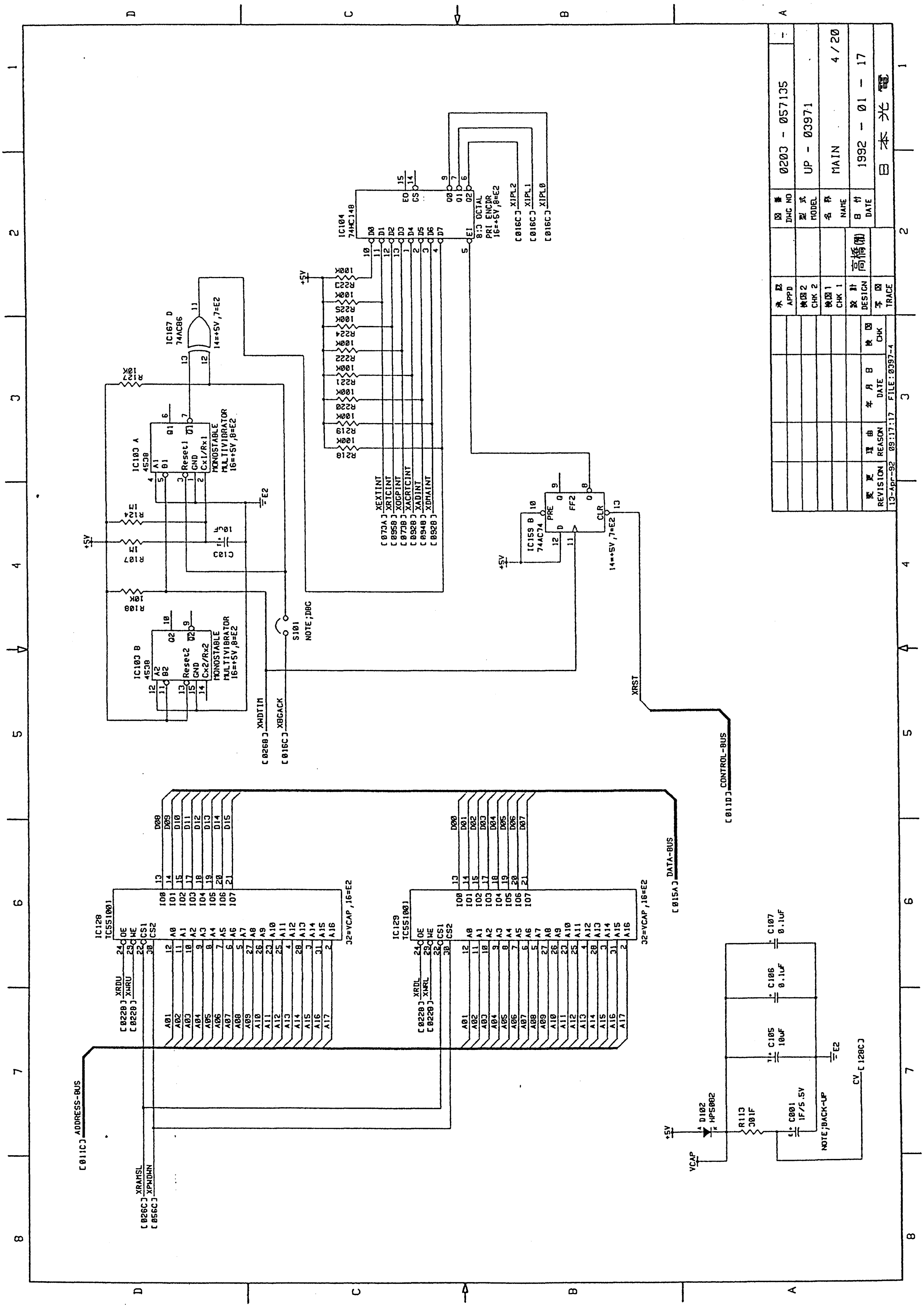
UP - 03971
MAIN
3 / 20
1992 - 01 - 17
日本光電
DWG NO
MODEL
NAME
DATE
APPD
CHK 2
CHK 1
DESIGN
TRACE
高橋(健)
REVISION
REASON
DATE
CHK
13-Apr-92 09:06:11
FILE: 0397-3
IC164 74AC245
IC165 74AC245
IC166 74AC245
IC163 74AC245
IC161 74AC245
IC162 74AC245
OCTAL BUS TRANSCEIVERS 20=+5V,10=E2
IC167 A 74AC86
IC167 B 74AC86
IC167 C 74AC86
14=+5V,7=E2
[011C] ADDRESS-BUS
[011D] CONTROL-BUS
[015A] DATA-BUS
[016C] XRESET
[072D] XEXINTA
XUDS
XLDS
R-XW
XAS
XDTACK
XBR [015C]
R-XW
[016A] PWDWN
[016C] XBCACK
[013C] XBC
[016C] XIPL2
[016C] XIPL1
[016C] XIPL0
[027D] XROMCS
R111 10K
R123 10K
R116 10K
R117 10K
R118 10K
R119 10K
R120 10K
R121 10K
R122 10K
R128 - R135 // 10Kohm
R136 - R143 // 10Kohm
C108
J010
PCN10EA-64S-2.54DS
NOTE;J010 // PCN10EA-64S-2.54DS(DS) TO ROMPACK
+5V
E2

MANUAL CHANGE INFORMATION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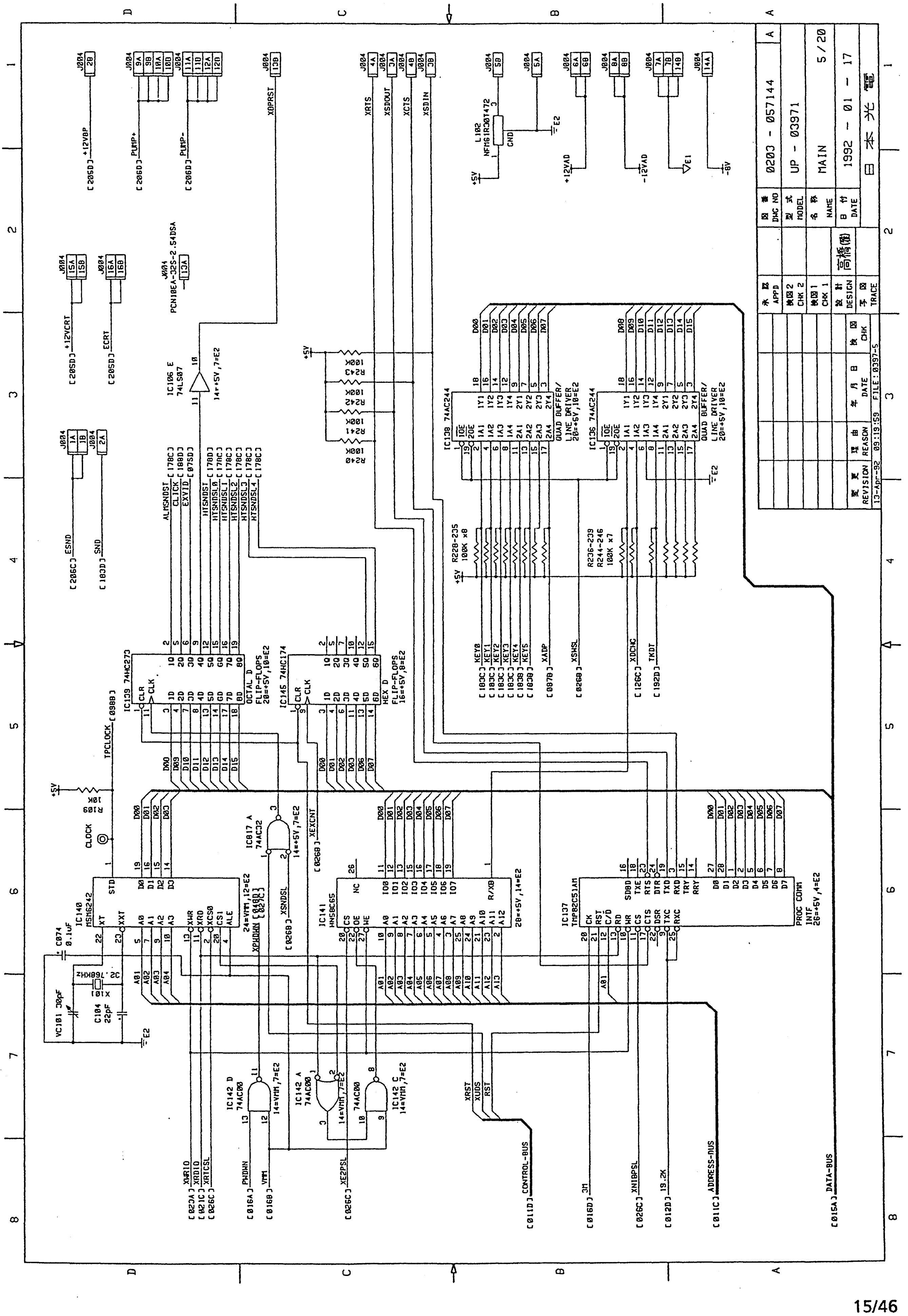
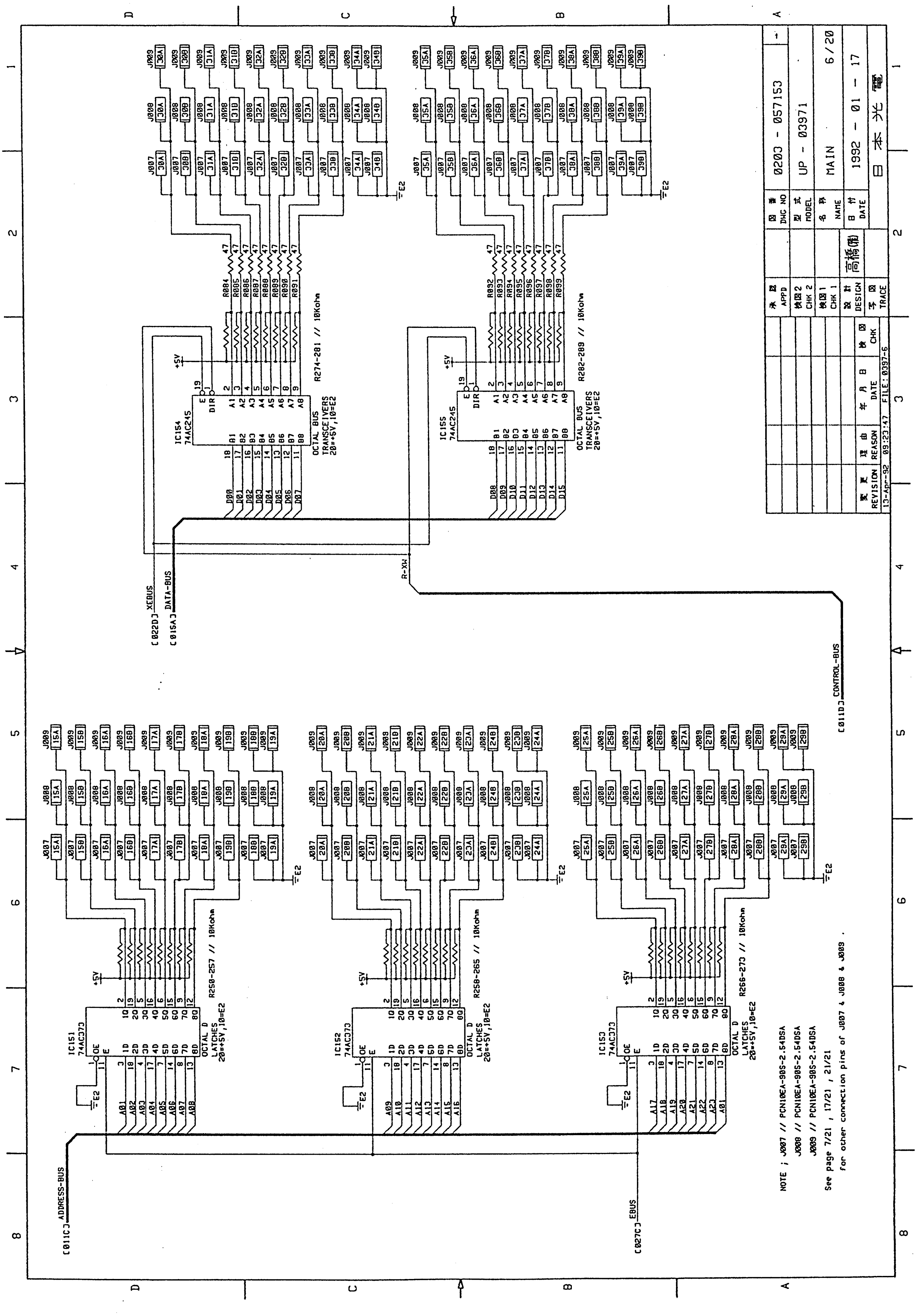
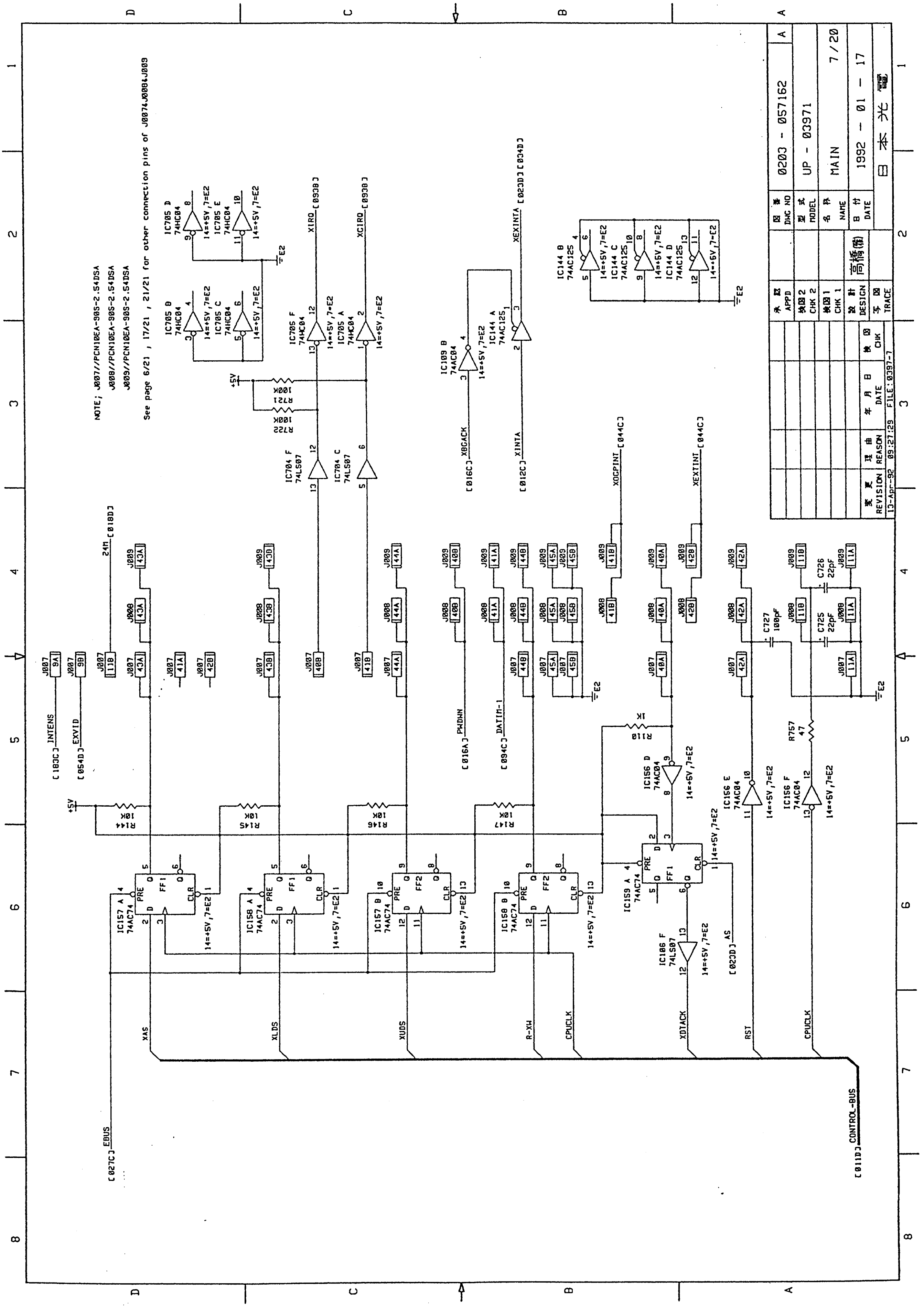
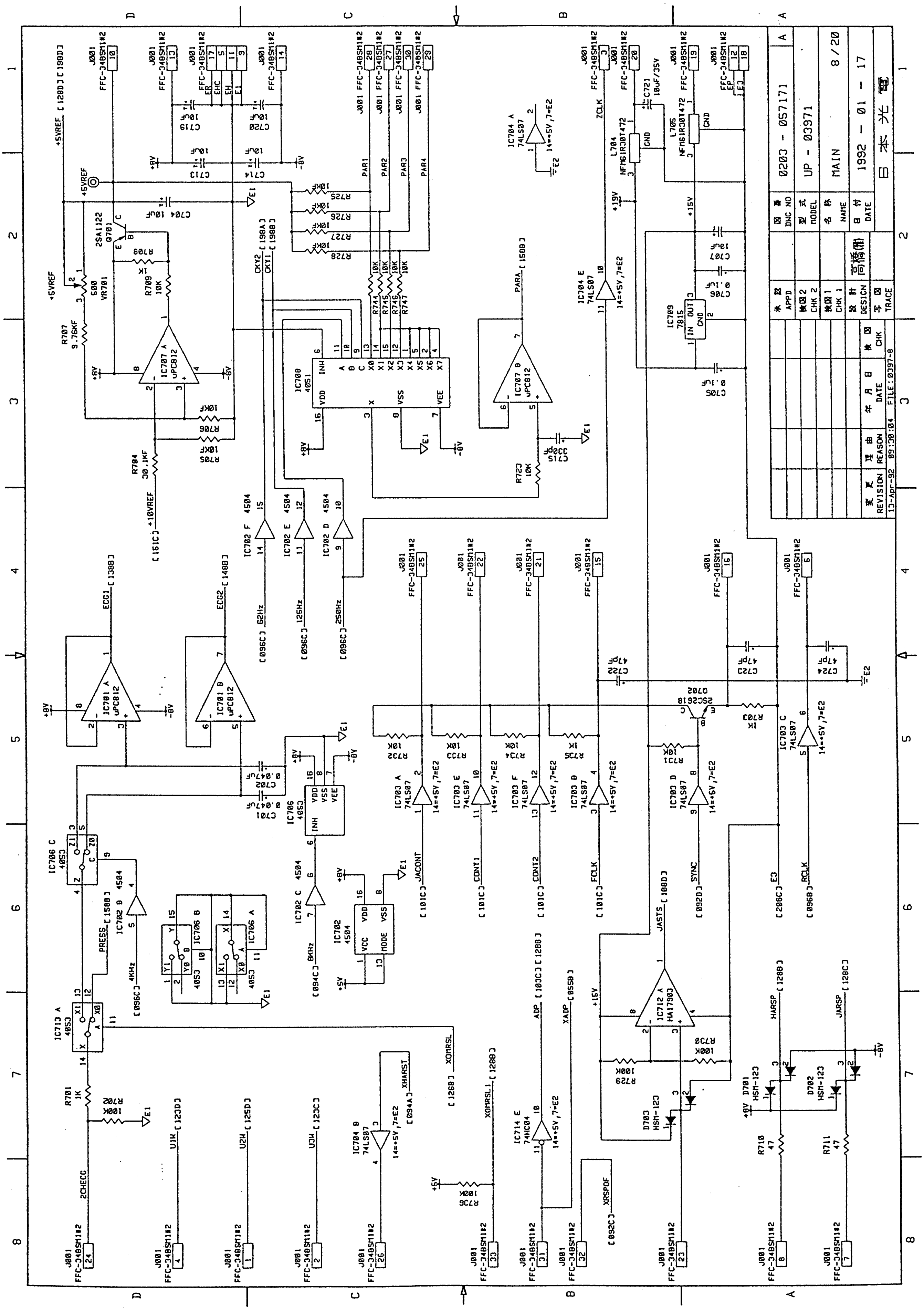
UP - 03971
MAIN
4/20
1992 - 01 - 17
日本光電
図番 DWG NO
型式 MODEL
名称 NAME
日付 DATE
承認 APPD
検図2 CHK 2
検図1 CHK 1
設計 DESIGN
高橋
写図 TRACE
変更 REVISION
理由 REASON
年月日 DATE
検図 CHK
13-Apr-92 09:17:17 FILE:0397-4
IC104 74HC148
8:3 OCTAL PRI ENCDR 16=+5V,8=E2
XIPL2
XIPL1
XIPL0
IC167 D 74AC86 14=+5V,7=E2
IC103 A 4538 MONOSTABLE MULTIVIBRATOR 16=+5V,8=E2
IC103 B 4538 MONOSTABLE MULTIVIBRATOR 16=+5V,8=E2
IC159 B 74AC74 14=+5V,7=E2
FF2
S101 NOTE;DBC
XEXTINT
XRTCINT
XOGPINT
XACRTCINT
XADINT
XDMAINT
XWDTIM
XBGACK
XRST
CONTROL-BUS
DATA-BUS
ADDRESS-BUS
IC128 TC551001 32=VCAP,16=E2
IC129 TC551001 32=VCAP,16=E2
XRDU
XWRU
XRDL
XWRL
XRAMSL
XPWDWN
D102 HP5082
R113 301F
C001 1F/5.5V NOTE;BACK-UP
C105 10uF
C106 0.1uF
C107 0.1uF
VCAP
CV
+5V
E2

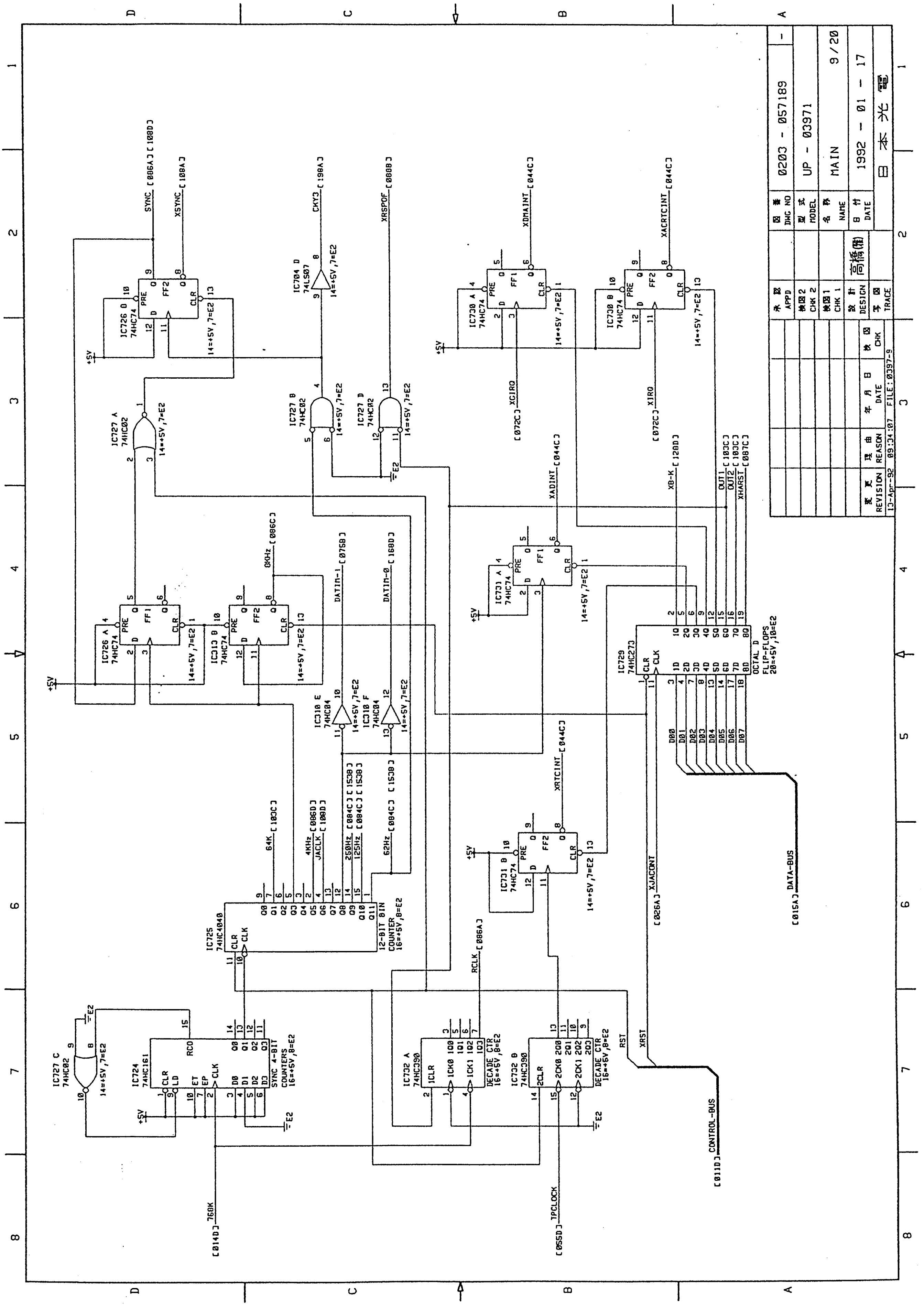

0203 - 057144
UP - 03971
MAIN
5/20
1992 - 01 - 17
日本光電
DWG NO
MODEL
NAME
DATE
APPD
CHK 2
CHK 1
DESIGN
TRACE
高橋
REVISION
REASON
DATE
CHK
13-Apr-92 09:19:59 FILE:0397-5
IC140 MSM6242
IC141 HN58C65
IC137 TMP82C51AM
IC139 74HC273
IC145 74HC174
IC138 74AC244
IC136 74AC244
IC106 E 74LS07
IC817 A 74AC32
IC142 D 74AC00
IC142 A 74AC00
IC142 C
X101 32.768KHz
VC101 30pF
C104 22pF
C074 0.1uF
R109 10K
R240 100K
R241 100K
R242 100K
R243 100K
R228-235 100K x8
R236-239 R244-246 100K x7
L102 NFM61R30T472
J004
PCN10EA-32S-2.54DSA
CONTROL-BUS
ADDRESS-BUS
DATA-BUS
XRTS
XSDOUT
XCTS
XSDIN
XDPRST
PUMP+
PUMP-
+12VCRT
ECRT
ESND
SND
+12VAD
-12VAD
-8V
E1
E2
+5V
CLOCK
TPCLOCK
XRST
XUDS
RST
XWRIO
XRDIO
XRTCSL
PWDWN
VMM
XE2PSL
XN1BPSL
19.2K
3M
XSNDSL
XEXCNT
XSWSL
XDCHG
TKOT
XADP
KEY0
KEY1
KEY2
KEY3
KEY4
KEY5
ALMSNDST
CLICK
EXVID
HTSNDST
OCTAL D FLIP-FLOPS
HEX D FLIP-FLOPS
QUAD BUFFER/LINE DRIVER
PROG COMM INTF

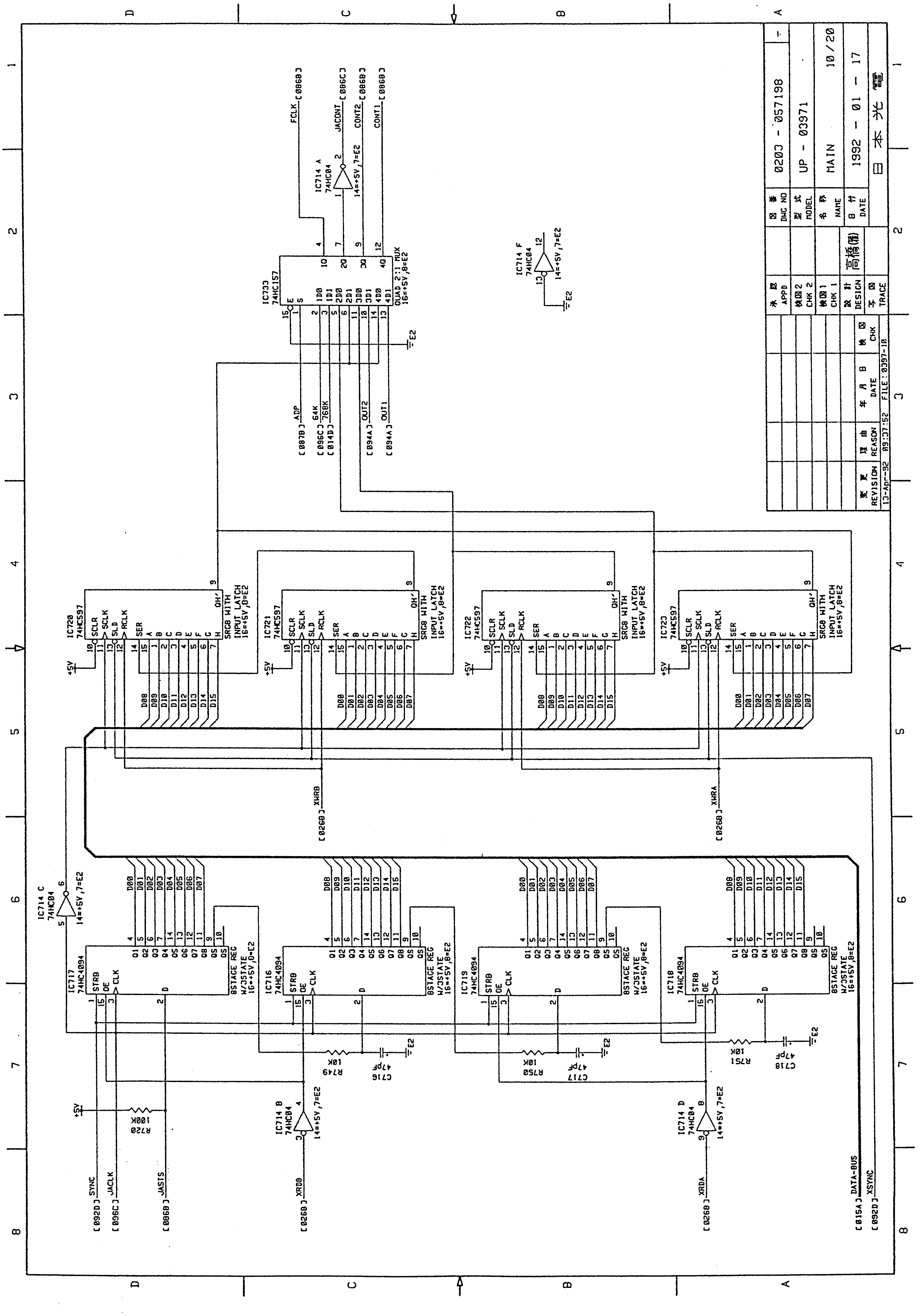
MANUAL CHANGE INFORMATION

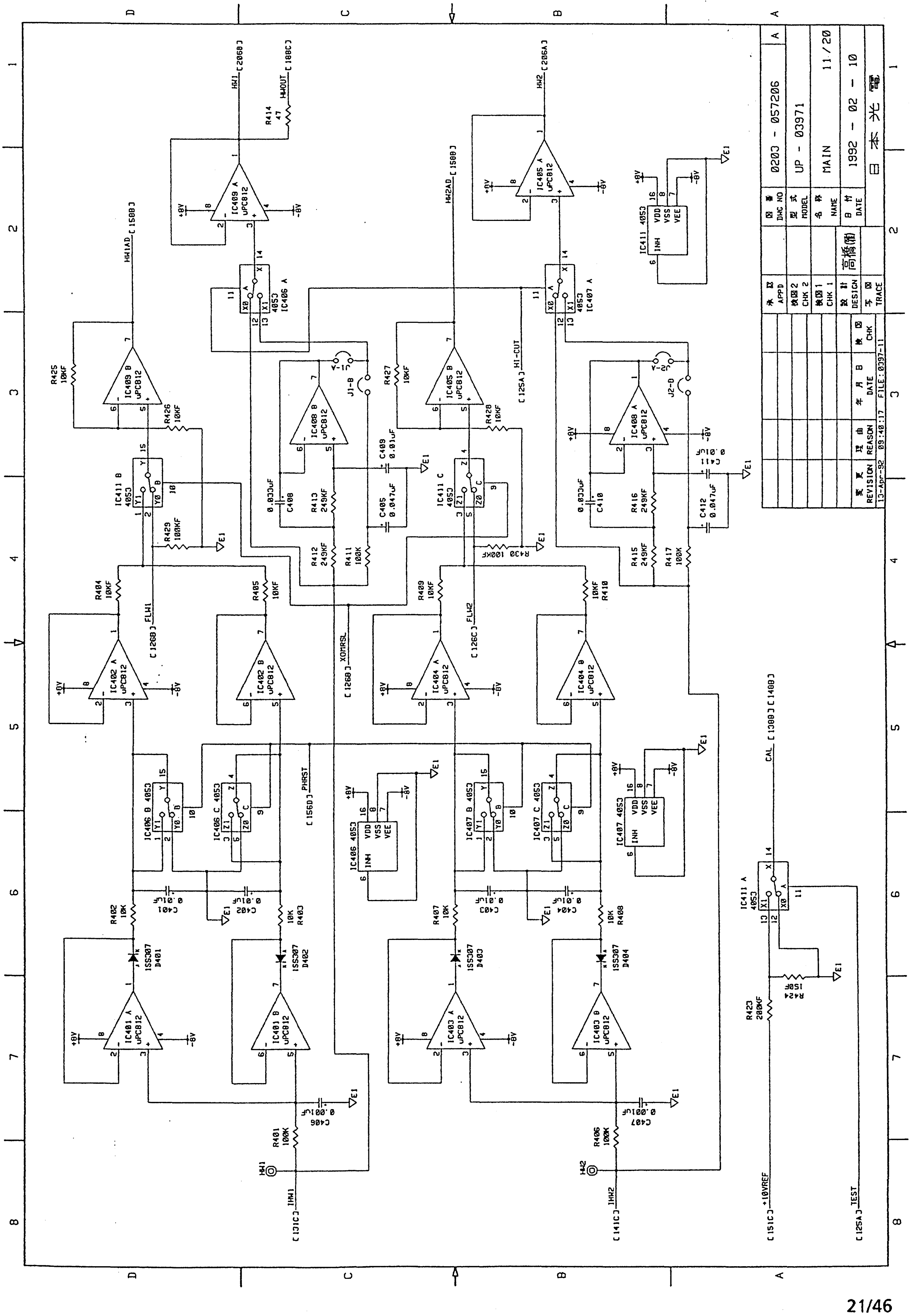

IC154
74AC245
OCTAL BUS TRANSCEIVERS
20=+5V,10=E2
R274-281 // 10Kohm
IC155
74AC245
R282-289 // 10Kohm
XEBUS
DATA-BUS
[022D]
[015A]
R-XW
CONTROL-BUS
[011D]
IC151
74AC373
OCTAL D LATCHES
20=+5V,10=E2
R250-257 // 10Kohm
IC152
74AC373
R258-265 // 10Kohm
IC153
74AC373
R266-273 // 10Kohm
ADDRESS-BUS
[011C]
EBUS
[027C]
+5V
E2
NOTE ; J007 // PCN10EA-90S-2.54DSA
J008 // PCN10EA-90S-2.54DSA
J009 // PCN10EA-90S-2.54DSA
See page 7/21 , 17/21 , 21/21
for other connection pins of J007 & J008 & J009 .
0203 - 057153
UP - 03971
MAIN
6/20
1992 - 01 - 17
日本光電
DWG NO
MODEL
NAME
DATE
APPD
CHK 2
CHK 1
DESIGN
TRACE
REVISION
REASON
CHK
13-Apr-92 09:23:47 FILE:0397-6


NOTE; J007//PCN10EA-90S-2.54DSA
J008//PCN10EA-90S-2.54DSA
J009//PCN10EA-90S-2.54DSA
See page 6/21 , 17/21 , 21/21 for other connection pins of J007,J008&J009
IC705 D 74HC04
IC705 E 74HC04
IC705 B 74HC04
IC705 C 74HC04
IC705 F 74HC04
IC705 A 74HC04
IC704 F 74LS07
IC704 C 74LS07
R721 100K
R722 100K
XIRQ [093B]
XCIRQ [093B]
IC109 B 74AC04
IC144 A 74AC125
IC144 B 74AC125
IC144 C 74AC125
IC144 D 74AC125
XEXINTA [023D] [034D]
[016C] XBGACK
[012C] XINTA
XOGPINT [044C]
XEXTINT [044C]
24M [018D]
INTENS [103C]
EXVID [054D]
PWDWN [016A]
DATIM-1 [094C]
R144 10K
R145 10K
R146 10K
R147 10K
R118 1K
R757 47
C727 100pF
C725 22pF
C726 22pF
IC157 A 74AC74
IC158 A 74AC74
IC157 B 74AC74
IC158 B 74AC74
IC159 A 74AC74
IC156 D 74AC04
IC156 E 74AC04
IC156 F 74AC04
IC186 F 74LS07
[023D] AS
XAS
XLDS
XUDS
R-XW
CPUCLK
XDTACK
RST
[027C] EBUS
[011D] CONTROL-BUS
14=+5V,7=E2
+5V
E2
0203 - 057162
UP - 03971
MAIN 7/20
1992 - 01 - 17
日本光電
DWG NO
MODEL
NAME
DATE
APPD
CHK 2
CHK 1
DESIGN
TRACE
REVISION
REASON
CHK
高橋(龍)
13-Apr-92 09:27:29 FILE:0397-7


0203 - 057171
A
UP - 03971
MAIN
8 / 20
1992 - 01 - 17
DWG NO
MODEL
NAME
DATE
APPD
CHK 2
CHK 1
DESIGN
TRACE
REVISION
REASON
DATE
CHK
13-Apr-92
09:30:04
FILE:0397-8
IC707 A uPC812
IC708 4051
IC701 A uPC812
IC701 B uPC812
IC706 4053
IC702 4504
IC712 A HA17903
IC709 7815
Q701 2SA1122
Q702 2SC2618
J001 FFC-34BSM1#2
+5VREF
+10VREF
ECC1
ECC2
PARA
ZCLK
JACONT
CONT1
CONT2
FCLK
SYNC
RCLK
JASTS
PRESS
XOMRSL
XOMRSL1
XHARST
ADP
XADP
XRSPOF
2CHECC
U1H
U2H
U3H
HARSP
JARSP
62Hz
125Hz
250Hz
4KHz
8KHz


0203 - 057189
UP - 03971
MAIN 9/20
1992 - 01 - 17
日本光電
図番 DWG NO
型式 MODEL
名称 NAME
日付 DATE
承認 APPD
検図2 CHK 2
検図1 CHK 1
設計 DESIGN
写図 TRACE
高橋
変更 REVISION
理由 REASON
年月日 DATE
検図 CHK
13-Apr-92 09:34:07 FILE:0397-9
SYNC [086A][108D]
XSYNC [108A]
CKY3 [198A]
XRSPOF [088B]
XDMAINT [044C]
XACRTCINT [044C]
IC726 D 74HC74 FF2
IC704 D 74LS07
IC730 A 74HC74 FF1
IC730 B 74HC74 FF2
XCIRQ [072C]
XIRQ [072C]
IC727 A 74HC02
IC727 B 74HC02
IC727 D 74HC02
XADINT [044C]
XB-K [120D]
OUT1 [103C]
OUT2 [103C]
XHARST [103C]
[087C]
0KHz [086C]
DATIN-1 [075B]
DATIN-0 [168D]
IC726 A 74HC74 FF1
IC313 B 74HC74 FF2
IC731 A 74HC74 FF1
IC729 74HC273 OCTAL D FLIP-FLOPS 20=+5V,10=E2
IC310 E 74HC04
IC310 F 74HC04
D00 D01 D02 D03 D04 D05 D06 D07
XRTCINT [044C]
DATA-BUS [015A]
64K [103C]
4KHz [086D]
JACLK [108D]
250Hz [084C][153B]
125Hz [084C][153B]
62Hz [084C][153B]
IC731 B 74HC74 FF2
XJACONT [026A]
IC725 74HC4040 12-BIT BIN COUNTER 16=+5V,8=E2
RCLK [086A]
IC727 C 74HC02
IC724 74HC161 SYNC 4-BIT COUNTERS 16=+5V,8=E2
IC732 A 74HC390 DECADE CTR 16=+5V,8=E2
IC732 B 74HC390 DECADE CTR 16=+5V,8=E2
RST
XRST
CONTROL-BUS [011D]
760K [014D]
TPCLOCK [055D]
14=+5V,7=E2
+5V
E2
A B C D
1 2 3 4 5 6 7 8


IC733 74HC157 QUAD 2:1 MUX 16=+5V,8=E2
IC714 A 74HC04 14=+5V,7=E2
IC714 F 74HC04 14=+5V,7=E2
IC714 B 74HC04 14=+5V,7=E2
IC714 C 74HC04 14=+5V,7=E2
IC714 D 74HC04 14=+5V,7=E2
IC720 74HC597 SRG8 WITH INPUT LATCH 16=+5V,8=E2
IC721 74HC597 SRG8 WITH INPUT LATCH 16=+5V,8=E2
IC722 74HC597 SRG8 WITH INPUT LATCH 16=+5V,8=E2
IC723 74HC597 SRG8 WITH INPUT LATCH 16=+5V,8=E2
IC717 74HC4094 8STAGE REG W/3STATE 16=+5V,8=E2
IC716 74HC4094 8STAGE REG W/3STATE 16=+5V,8=E2
IC719 74HC4094 8STAGE REG W/3STATE 16=+5V,8=E2
IC718 74HC4094 8STAGE REG W/3STATE 16=+5V,8=E2
R749 10K
R750 10K
R751 10K
R720 100K
C716 47pF
C717 47pF
C718 47pF
FCLK [086B]
JACONT [086C]
CONT2 [086B]
CONT1 [086B]
[087B] ADP
[096C] 64K
[014D] 768K
[094A] OUT2
[094A] OUT1
[026B] XHRB
[026B] XHRA
[092D] SYNC
[096C] JACLK
[086B] JASTS
[026B] XRDB
[026B] XRDA
[015A] DATA-BUS
[092D] XSYNC
D00 D01 D02 D03 D04 D05 D06 D07
D08 D09 D10 D11 D12 D13 D14 D15
+5V
E2
図番 DWG NO 0203 - 057198 -
型式 MODEL UP - 03971
名称 NAME MAIN 10/20
日付 DATE 1992 - 01 - 17
日本光電
承認 APPD
検図2 CHK 2
検図1 CHK 1
設計 DESIGN 高橋(勝)
写図 TRACE
変更 REVISION
理由 REASON
年月日 DATE
検図 CHK
13-Apr-92 09:37:52 FILE:0397-10
A B C D
1 2 3 4 5 6 7 8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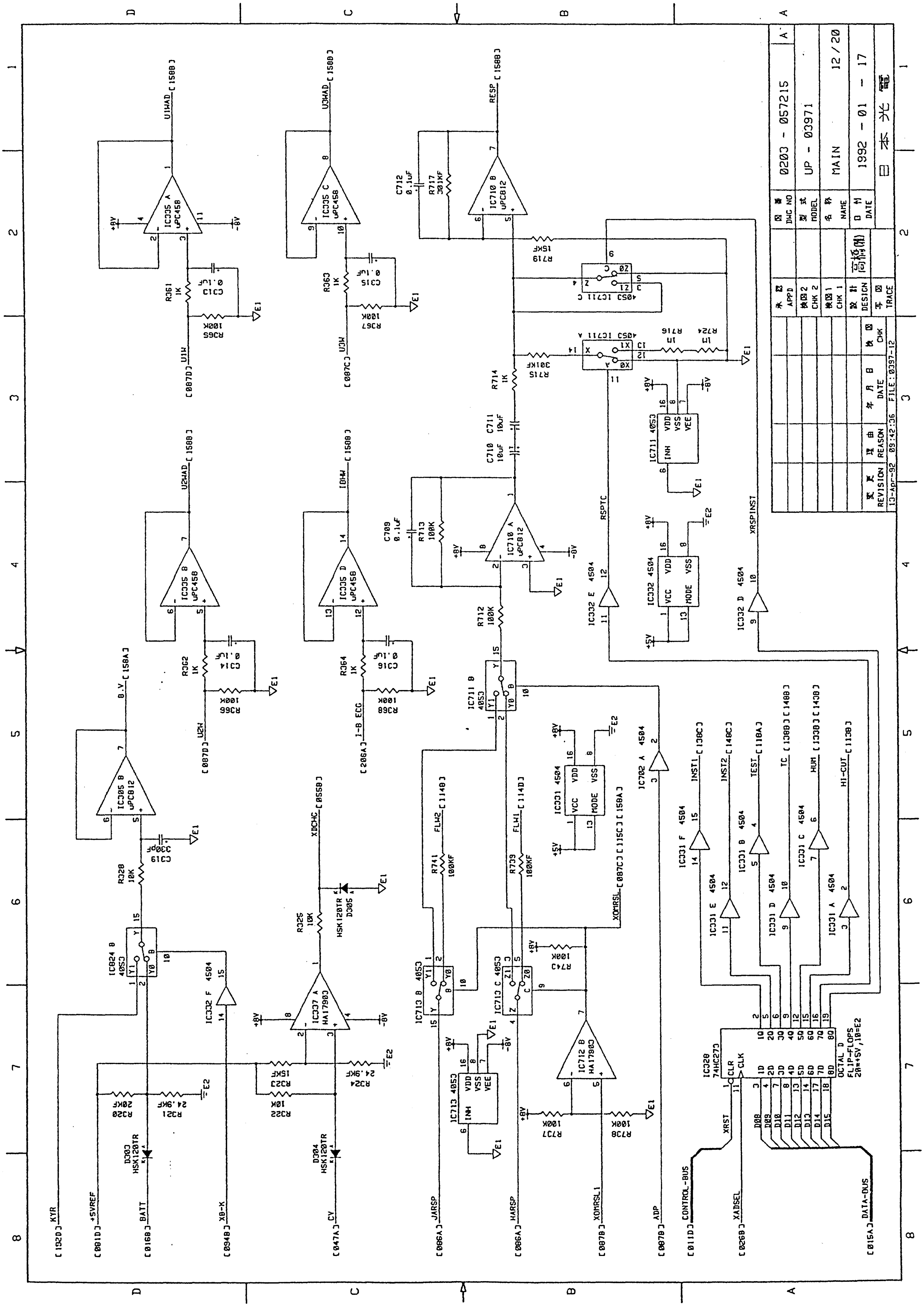
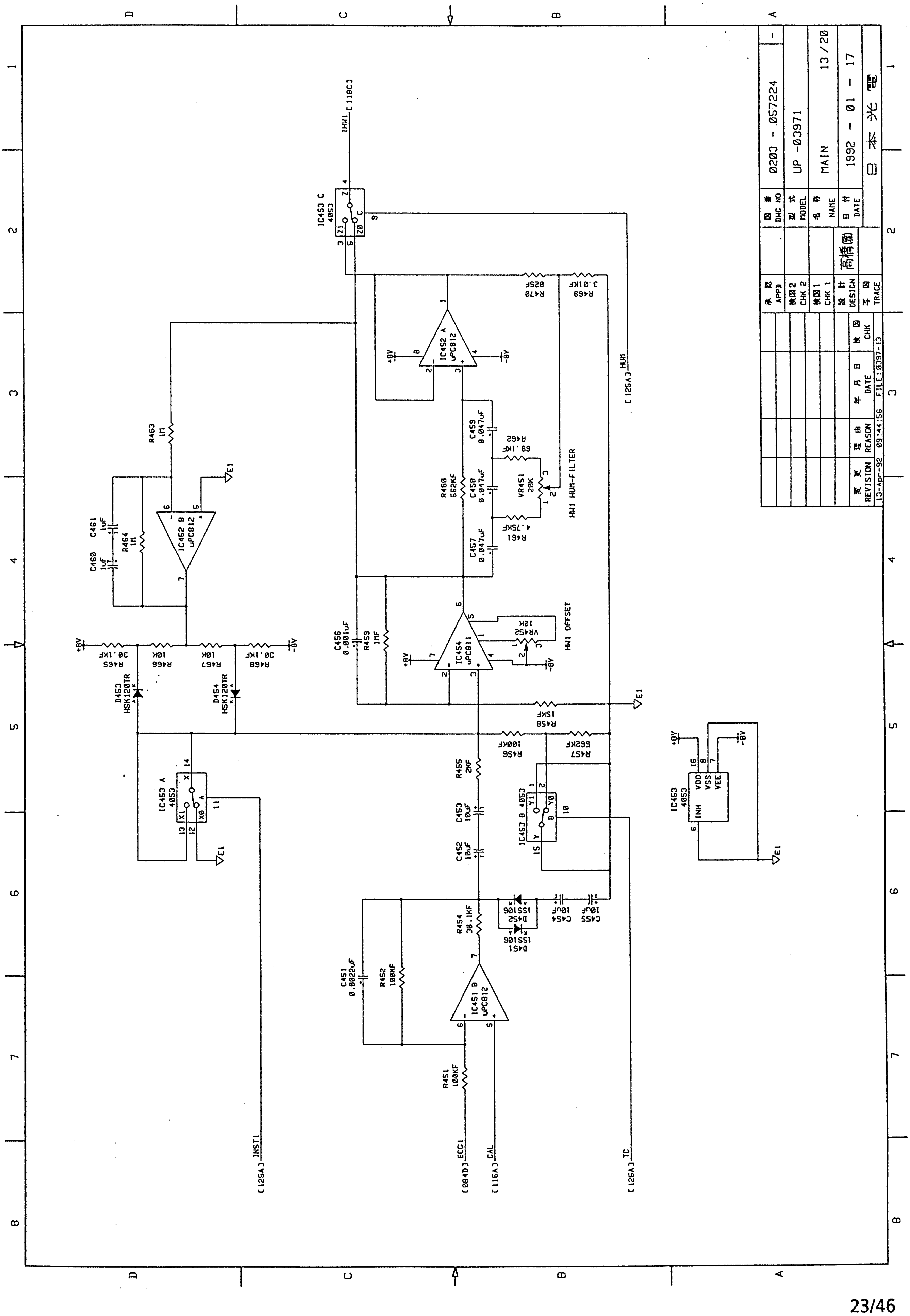
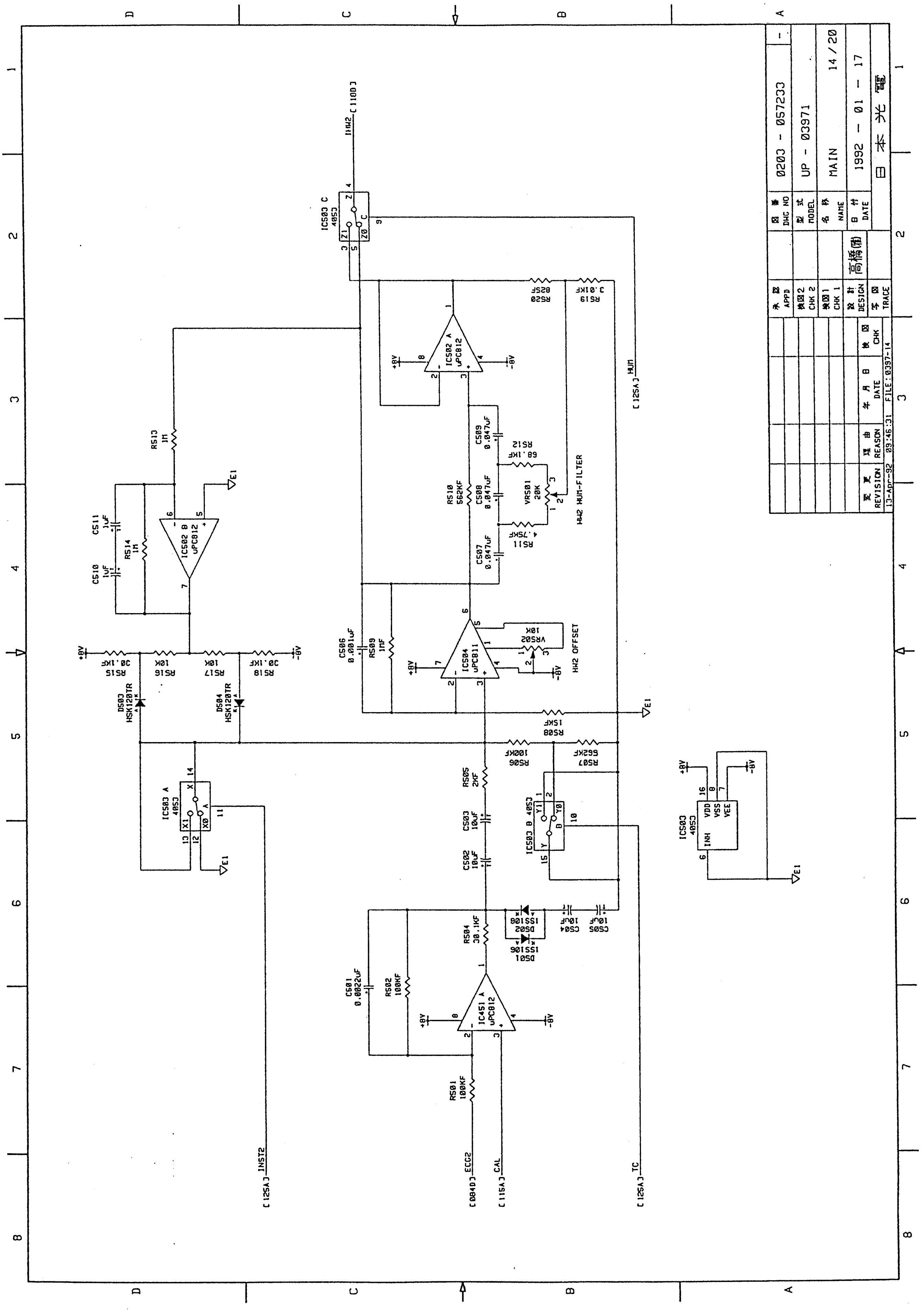
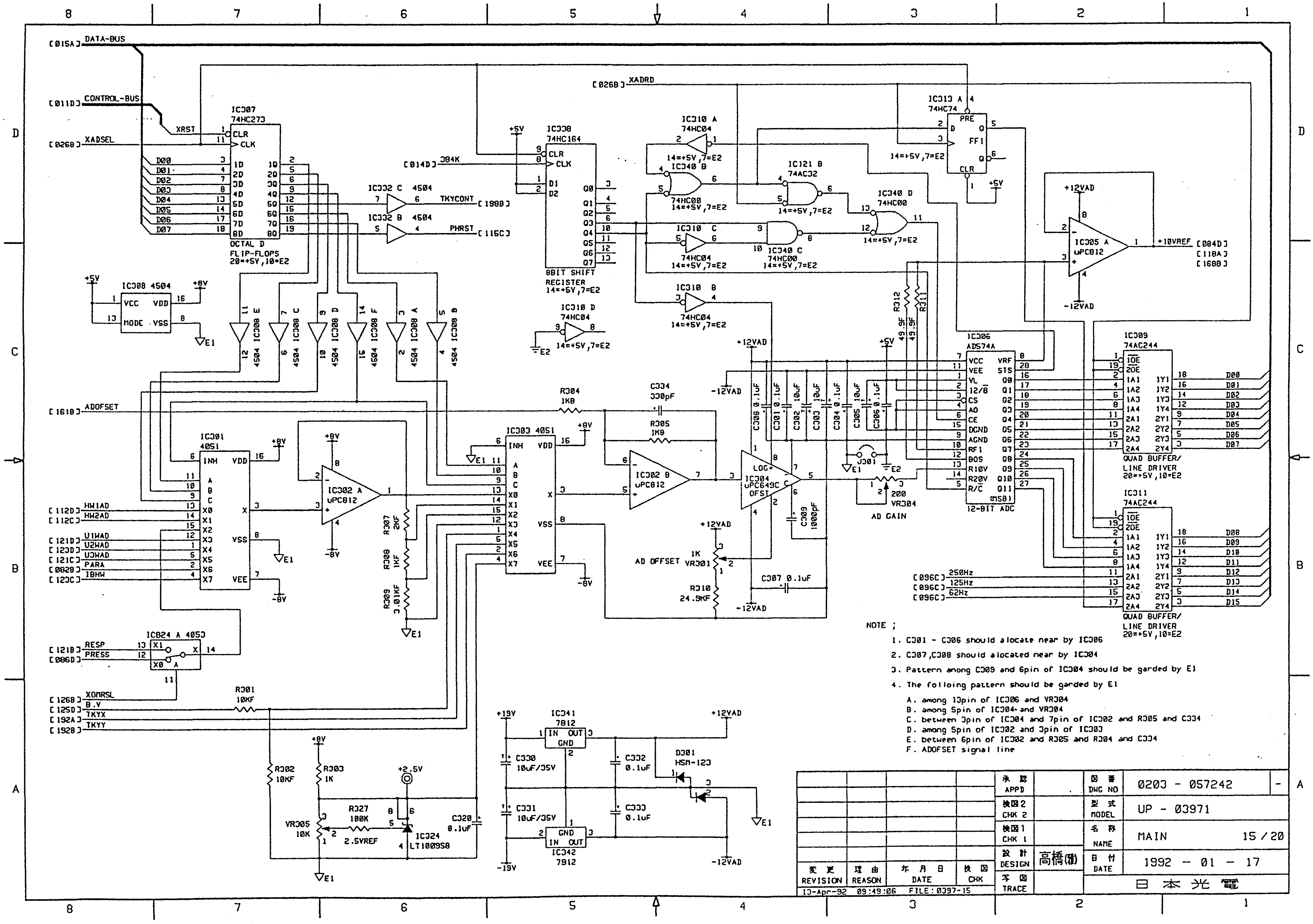
A
UP - 03971
MAIN
11/20
1992 - 02 - 10
日本光電
DWG NO
MODEL
NAME
DATE
APPD
CHK 2
CHK 1
DESIGN
TRACE
REVISION
REASON
DATE
CHK
13-Apr-92 09:40:17 FILE:0397-11
IC401 A uPC812
IC401 B uPC812
IC402 A uPC812
IC402 B uPC812
IC403 A uPC812
IC403 B uPC812
IC404 A uPC812
IC404 B uPC812
IC405 A uPC812
IC405 B uPC812
IC408 A uPC812
IC408 B uPC812
IC409 A uPC812
IC409 B uPC812
IC406 4053
IC407 4053
IC411 4053
HW1
HW2
HW1AD
HW2AD
HWOUT
HI-CUT
FLW1
FLW2
XOHRSL
PHRST
CAL
+10VREF
TEST
IHW1
IHW2
J1-B
J2-D
E1
+8V
-8V


0203 - 057215
UP - 03971
MAIN
12 / 20
1992 - 01 - 17
日本光電
DWG NO
MODEL
NAME
DATE
APPD
CHK 2
CHK 1
DESIGN
TRACE
REVISION
REASON
DATE
CHK
10-Apr-92 09:42:36 FILE:0397-12
IC305 A uPC458
IC305 B uPC458
IC305 C uPC458
IC305 D uPC458
IC305 B uPC812
IC710 A uPC812
IC710 B uPC812
IC337 A HA17903
IC712 B HA17903
IC711 4053
IC713 4053
IC824 B 4053
IC331 4504
IC332 4504
IC328 74HC273
OCTAL D FLIP-FLOPS
U1HAD
U3HAD
U2HAD
IBHW
RESP
8.V
XDCHC
U1H
U3H
U2H
I-B ECG
RSPTC
XRSPINST
INST1
INST2
TEST
TC
HUM
HI-CUT
FLW2
FLW1
XOMRSL
KYR
+5VREF
BATT
X8-K
CY
JARSP
HARSP
XOMRSL1
ADP
CONTROL-BUS
XADSEL
DATA-BUS
XRST
CLK
CLR
D08
D09
D10
D11
D12
D13
D14
D15
E1
E2
+8V
-8V
+5V
HSK120TR
D303
D304
D305


0203 - 057224
UP -03971
MAIN
13 / 20
1992 - 01 - 17
日本光電
図番 DWG NO
型式 MODEL
名称 NAME
日付 DATE
承認 APPD
検図2 CHK 2
検図1 CHK 1
設計 DESIGN
写図 TRACE
高橋
変更 REVISION
理由 REASON
年月日 DATE
検図 CHK
13-Apr-92 09:44:56 FILE:0397-13
IC453 C 4053
HH1 [118C]
IC452 A uPC812
IC452 B uPC812
IC454 uPC811
IC451 B uPC812
IC453 A 4053
IC453 B 4053
IC453 4053
VDD VSS VEE INH
R470 825F
R469 3.01KF
R463 1M
R464 1M
C460 1uF
C461 1uF
C459 0.047uF
C458 0.047uF
C457 0.047uF
R460 562KF
R462 68.1KF
R461 4.75KF
VR451 20K
HH1 HUM-FILTER
VR452 10K
HH1 OFFSET
C456 0.001uF
R459 1MF
R465 30.1KF
R466 10K
R467 10K
R468 30.1KF
D453 HSK120TR
D454 HSK120TR
R458 15KF
R456 100KF
R457 562KF
R455 2KF
C453 10uF
C452 10uF
R454 30.1KF
D451 1SS106
D452 1SS106
C454 10uF
C455 10uF
C451 0.0022uF
R452 100KF
R451 100KF
[125A] HUM
[125A] INST1
[084D] ECG1
[115A] CAL
[126A] TC
+8V
-8V
E1

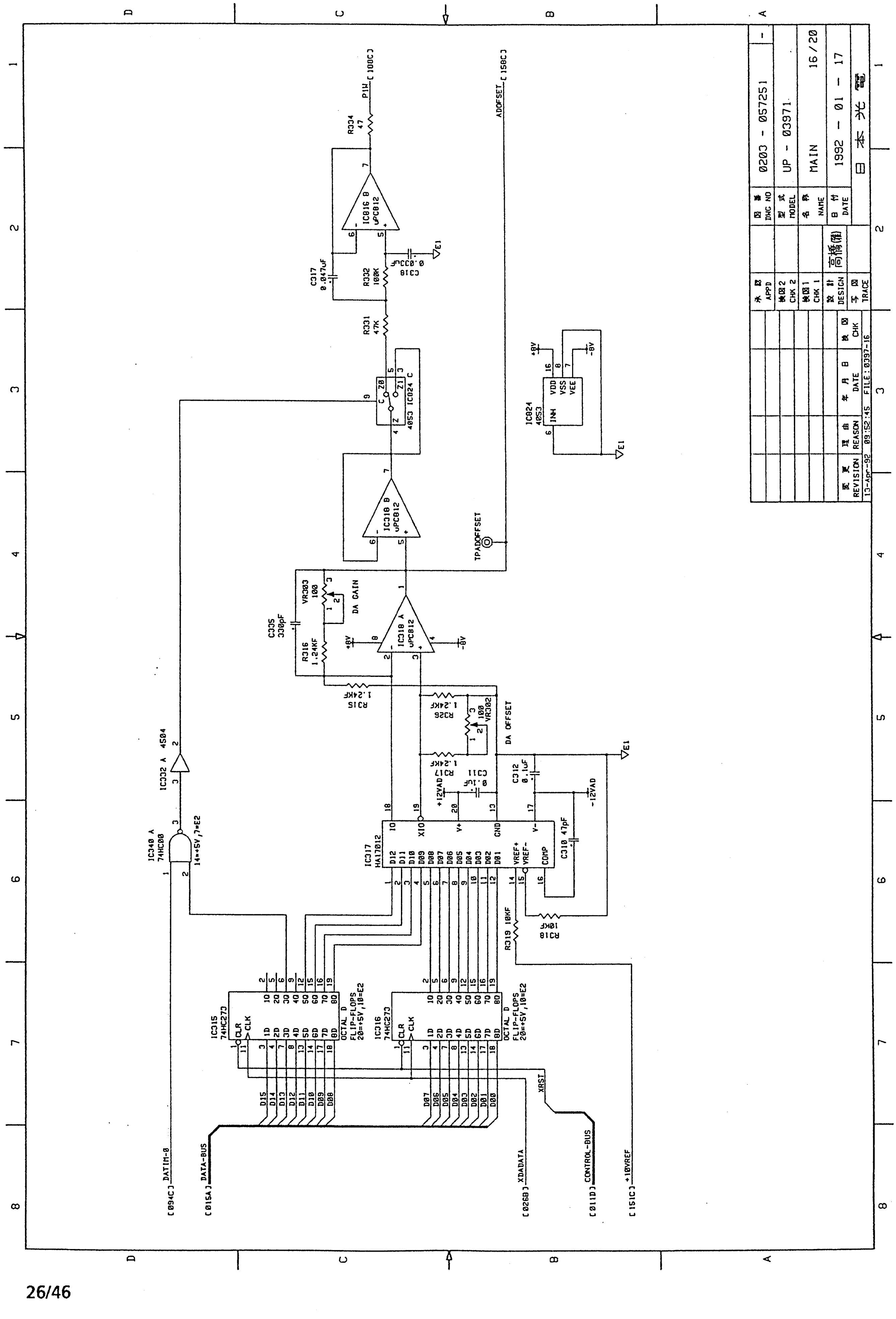

図番 DWG NO 0203 - 057233
型式 MODEL UP - 03971
名称 NAME MAIN 14/20
日付 DATE 1992 - 01 - 17
日本光電
承認 APPD
検図2 CHK 2
検図1 CHK 1
設計 DESIGN 高橋
写図 TRACE
変更 REVISION
理由 REASON
年月日 DATE
検図 CHK
13-Apr-92 09:46:31 FILE: 0397-14
IC503 C 4053
HM2 [110D]
IC502 A uPC812
R520 825F
R519 3.01KF
HUM [125A]
C509 0.047uF
R512 68.1KF
R510 562KF
C508 0.047uF
VR501 20K
HM2 HUM-FILTER
C507 0.047uF
R511 4.75KF
R513 1M
C511 1uF
C510 1uF
R514 1M
IC502 B uPC812
E1
C506 0.001uF
R509 1MF
IC504 uPC811
VR502 10K
HM2 OFFSET
R515 30.1KF
R516 10K
R517 10K
R518 30.1KF
D503 HSK120TR
D504 HSK120TR
R508 15KF
R506 100KF
R507 562KF
R505 2KF
C503 10uF
C502 10uF
IC503 A 4053
IC503 B 4053
IC503 4053
VDD VSS VEE INH
R504 30.1KF
D501 1SS106
D502 1SS106
C504 10uF
C505 10uF
C501 0.0022uF
R502 100KF
IC451 A uPC812
R501 100KF
[125A] INST2
[084D] ECG2
[115A] CAL
[125A] TC
+8V
-8V
A B C D
1 2 3 4 5 6 7 8

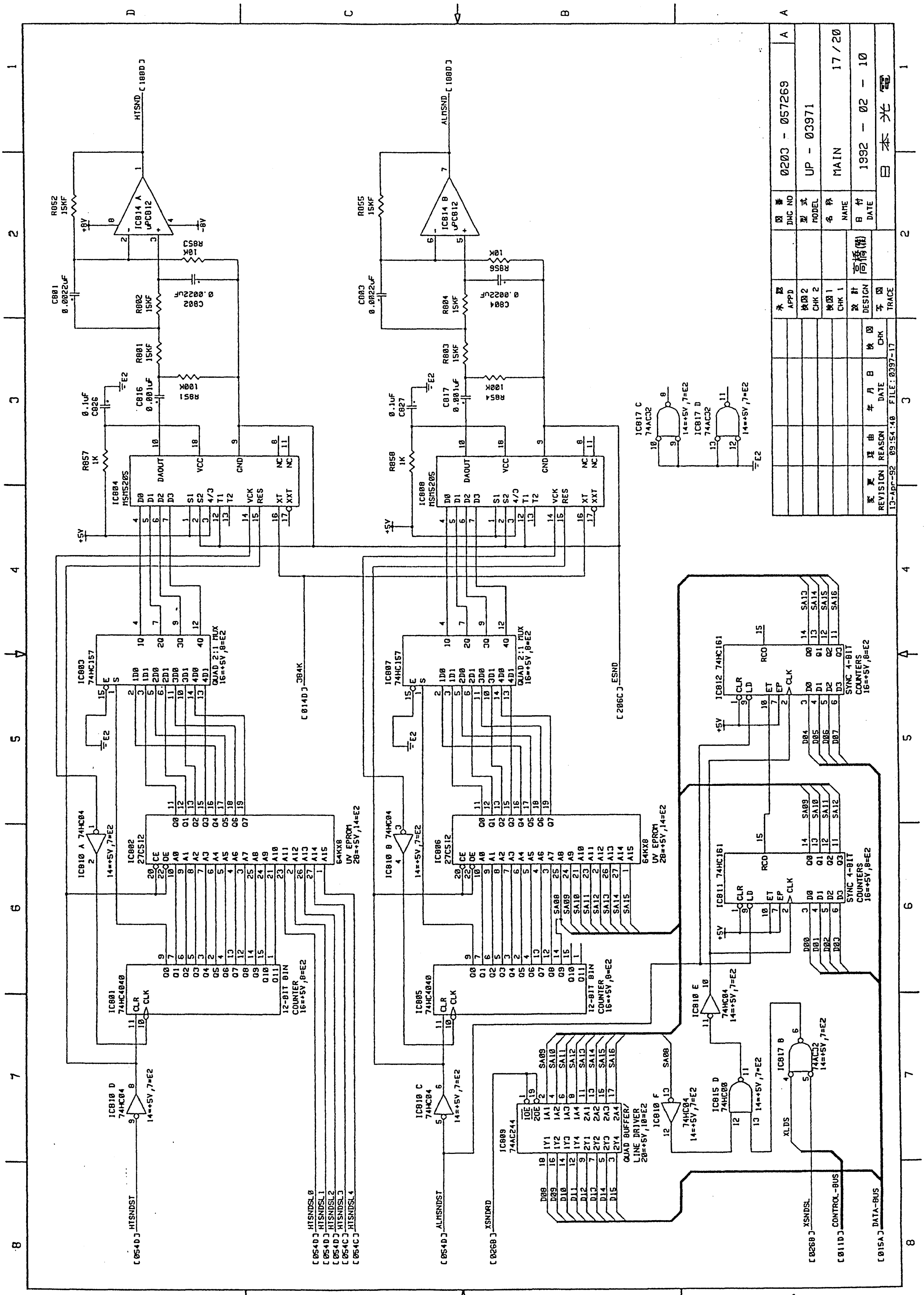

[015A] DATA-BUS
[011D] CONTROL-BUS
[026B] XADSEL
XRST
D00 D01 D02 D03 D04 D05 D06 D07
IC307 74HC273
OCTAL D FLIP-FLOPS 20=+5V,10=E2
IC332 C 4504
IC332 B 4504
TKYCONT [198B]
PHRST [115C]
IC308 4504
VCC VDD MODE VSS
[014D] 384K
IC338 74HC164
8BIT SHIFT REGISTER 14=+5V,7=E2
[026B] XADRD
IC310 A 74HC04
IC310 B 74HC04
IC310 C 74HC04
IC310 D 74HC04
IC340 B 74HC00
IC340 C 74HC00
IC340 D 74HC00
IC121 B 74AC32
IC313 A 74HC74
PRE D FF1 Q CLR
14=+5V,7=E2
IC305 A uPC812
+10VREF [084D] [118A] [168B]
+12VAD
-12VAD
R312 49.9F
R311 49.9F
IC306 ADS74A
12-BIT ADC
IC309 74AC244
IC311 74AC244
QUAD BUFFER/ LINE DRIVER 20=+5V,10=E2
D08 D09 D10 D11 D12 D13 D14 D15
[096C] 250Hz
[096C] 125Hz
[096C] 62Hz
[161B] ADOFSET
IC301 4051
IC303 4051
IC302 A uPC812
IC302 B uPC812
IC304 uPC649C
LOG OFST
R304 1K0
R305 1K0
C334 330pF
R307 2KF
R308 1KF
R309 3.01KF
C301 - C308
C309 1000pF
C307 0.1uF
J301
VR304 200 AD GAIN
VR301 1K AD OFFSET
R310 24.9KF
[112D] HW1AD
[112C] HW2AD
[121D] U1HAD
[120D] U2HAD
[121C] U3HAD
[082B] PARA
[123C] IBHW
IC824 A 4053
[121B] RESP
[086D] PRESS
[126B] XOHRSL
[125D] B.V
[192A] TKYX
[192B] TKYY
R301 10KF
R302 10KF
R303 1K
VR305 10K
R327 100K
2.5VREF
+2.5V
IC324 LT1009S8
C320 0.1uF
IC341 7812
IC342 7912
C330 10uF/35V
C331 10uF/35V
C332 0.1uF
C333 0.1uF
D301 HSM-123
+19V
-19V
E1 E2

NOTE ;

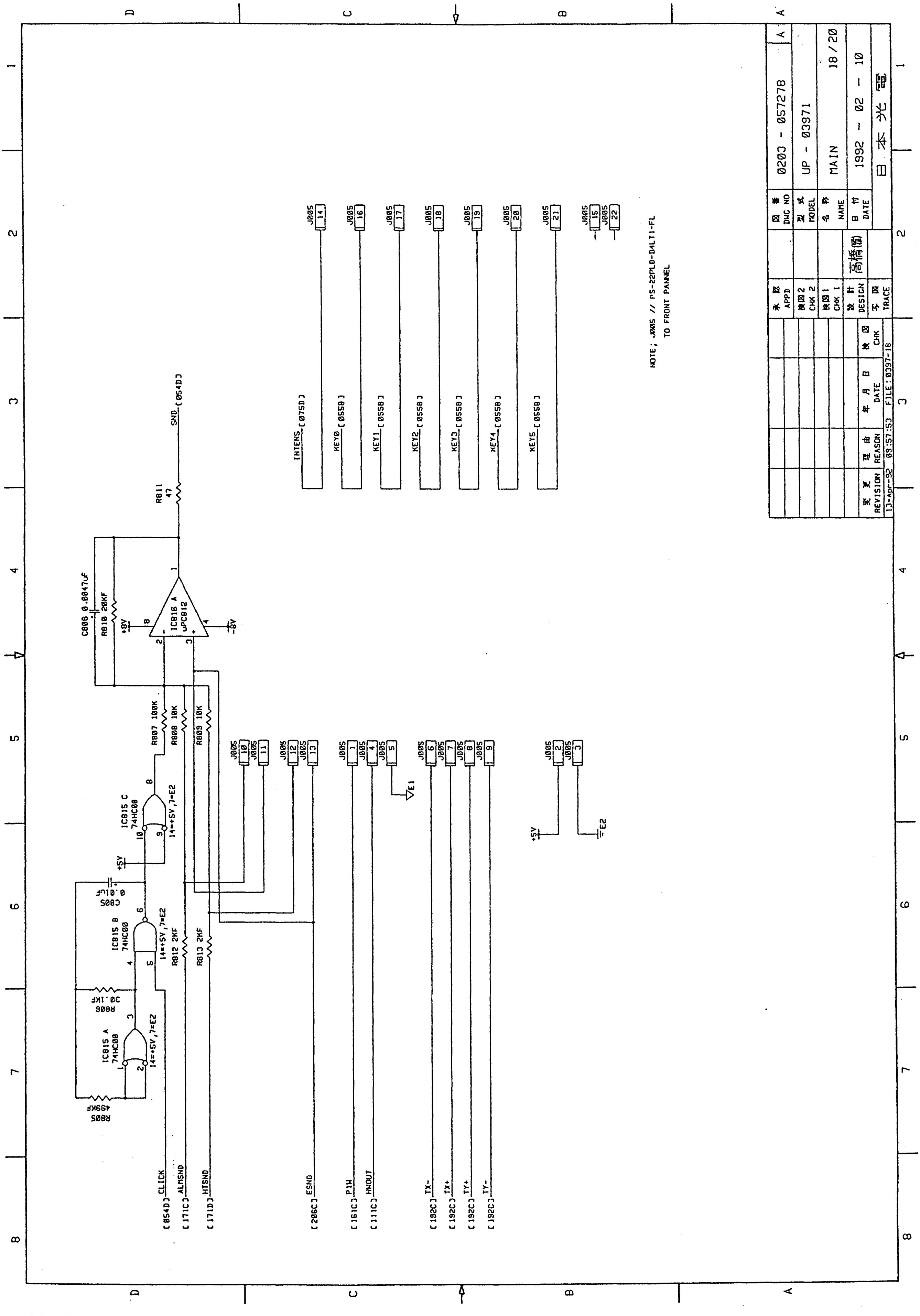
1. C301 - C306 should alocate near by IC306
2. C307,C308 should alocated near by IC304
3. Pattern among C309 and 6pin of IC304 should be garded by E1
4. The folloing pattern should be garded by E1
   A. among 13pin of IC306 and VR304
   B. among 5pin of IC304 and VR304
   C. between 3pin of IC304 and 7pin of IC302 and R305 and C334
   D. among 5pin of IC302 and 3pin of IC303
   E. between 6pin of IC302 and R305 and R304 and C334
   F. ADOFSET signal line

変更 REVISION	理由 REASON	年月日 DATE	検図 CHK	承認 APPD		図番 DWG NO	0203 - 057242 -
				検図2 CHK 2		型式 MODEL	UP - 03971
				検図1 CHK 1		名称 NAME	MAIN 15 / 20
				設計 DESIGN	高橋(雅)	日付 DATE	1992 - 01 - 17
13-Apr-92	09:49:06	FILE:0397-15		写図 TRACE		日本光電	

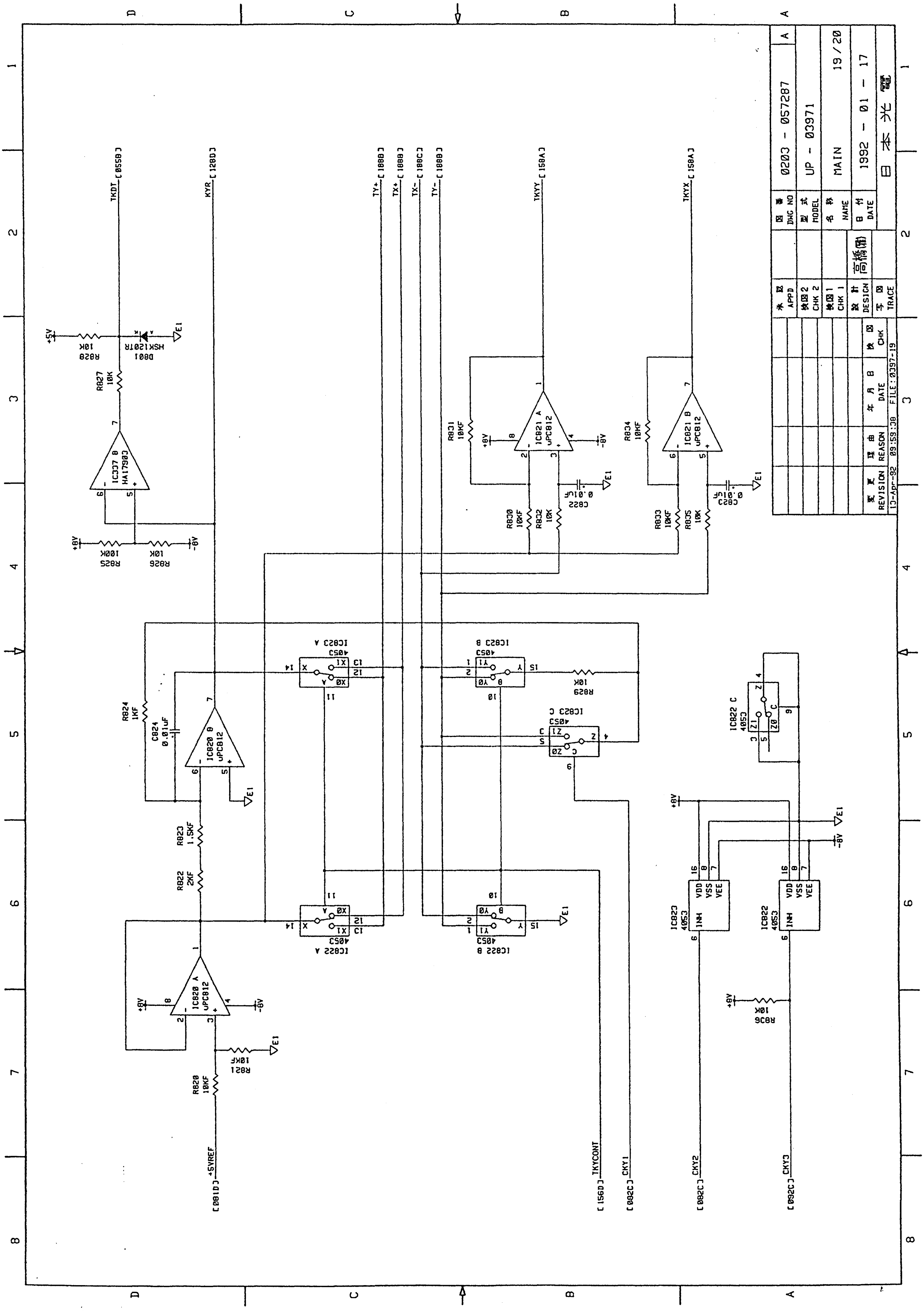

0203 - 057251
UP - 03971
MAIN
16/20
1992 - 01 - 17
日本光電
13-Apr-92 09:52:45 FILE:0397-16
IC317 HA17012
IC315 74HC273
IC316 74HC273
OCTAL D FLIP-FLOPS 20=+5V,10=E2
IC318 A uPC812
IC318 B uPC812
IC816 B uPC812
IC024 4053
IC340 A 74HC00
IC332 A 4584
VR303 100 DA GAIN
VR302 100 DA OFFSET
TPADOFFSET
ADOFSET [150C]
PIN [100C]
[094C] DATIM-0
[015A] DATA-BUS
[026B] XDADATA
[011D] CONTROL-BUS
[151C] +10VREF
XRST

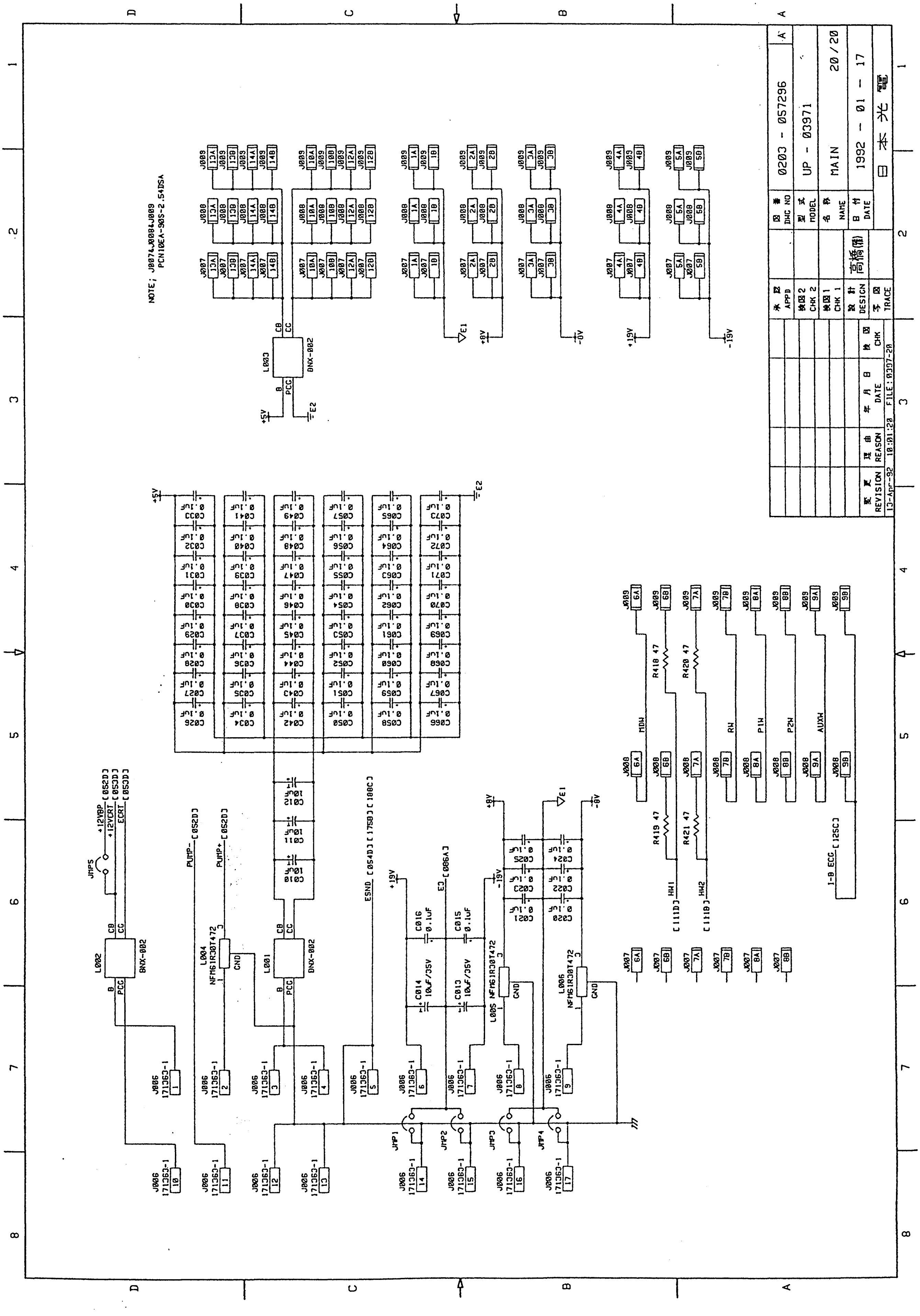

HTSND [100D]
ALMSND [100D]
IC814 A uPC812
IC814 B uPC812
R852 15KF
R855 15KF
R853 10K
R856 10K
C801 0.0022uF
C803 0.0022uF
C802 0.0022uF
C804 0.0022uF
R802 15KF
R804 15KF
R801 15KF
R803 15KF
R851 100K
R854 100K
C816 0.001uF
C817 0.001uF
C826 0.1uF
C827 0.1uF
R857 1K
R858 1K
IC804 MSM5205
IC808 MSM5205
D0 D1 D2 D3 DAOUT VCC GND S1 S2 4/3 T1 T2 VCK RES XT XXT NC
+5V
E2
IC803 74HC157
IC807 74HC157
QUAD 2:1 MUX 16=+5V,8=E2
384K [014D]
ESND [206C]
IC802 27C512
IC806 27C512
64KX8 UV EPROM 28=+5V,14=E2
IC810 A 74HC04
IC810 B 74HC04
IC810 C 74HC04
IC810 D 74HC04
IC810 E 74HC04
IC810 F 74HC04
14=+5V,7=E2
IC801 74HC4040
IC805 74HC4040
12-BIT BIN COUNTER 16=+5V,8=E2
CLR CLK
IC811 74HC161
IC812 74HC161
SYNC 4-BIT COUNTERS 16=+5V,8=E2
RCO ET EP LD
SA08 SA09 SA10 SA11 SA12 SA13 SA14 SA15 SA16
D00 D01 D02 D03 D04 D05 D06 D07
D08 D09 D10 D11 D12 D13 D14 D15
IC809 74AC244
QUAD BUFFER/ LINE DRIVER 20=+5V,10=E2
IC815 D 74HC08
IC817 B 74AC32
IC817 C 74AC32
IC817 D 74AC32
XLDS
[054D] HTSNDST
[054D] HTSNDSL0
[054D] HTSNDSL1
[054D] HTSNDSL2
[054C] HTSNDSL3
[054C] HTSNDSL4
[054D] ALMSNDST
[026B] XSNDRD
[026B] XSNDSL
[011D] CONTROL-BUS
[015A] DATA-BUS
A B C D
1 2 3 4 5 6 7 8
図番 DWG NO 0203 - 057269 A
型式 MODEL UP - 03971
名称 NAME MAIN 17 / 20
日付 DATE 1992 - 02 - 10
日本光電
承認 APPD
検図2 CHK 2
検図1 CHK 1
設計 DESIGN 高橋(悦)
写図 TRACE
変更 REVISION
理由 REASON
年月日 DATE
検図 CHK
13-Apr-92 09:54:40 FILE: 0397-17

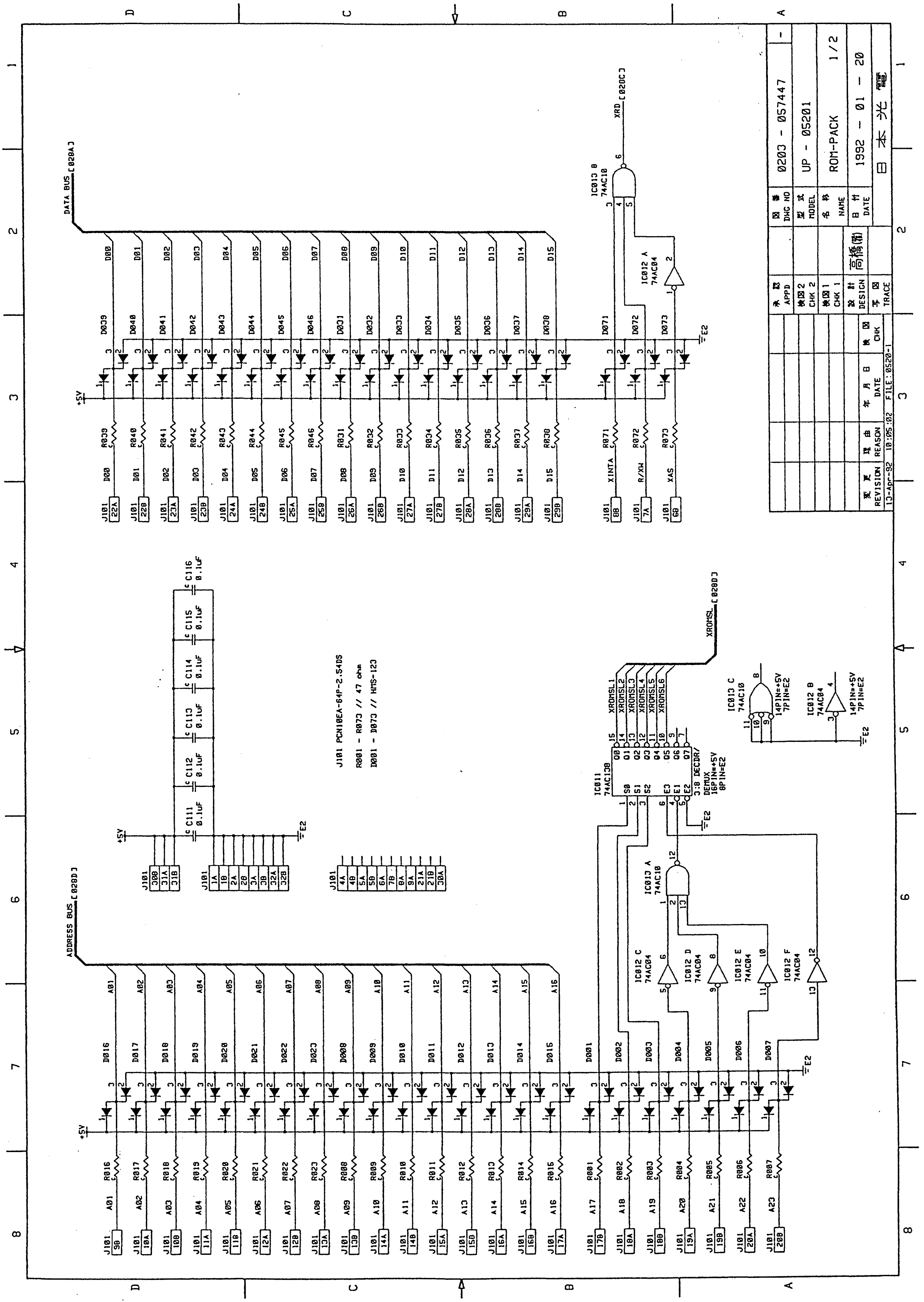
MANUAL CHANGE INFORMATION

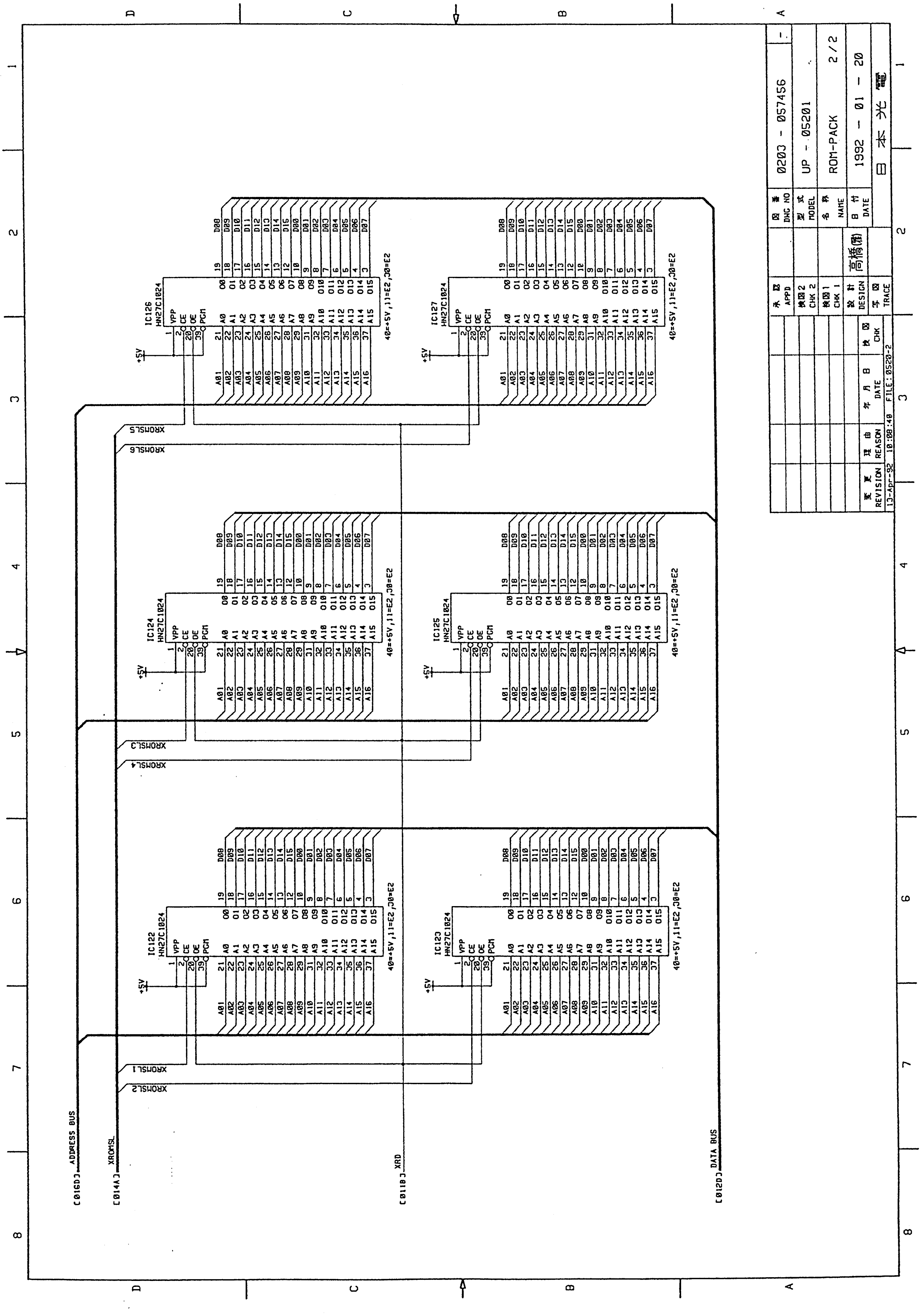


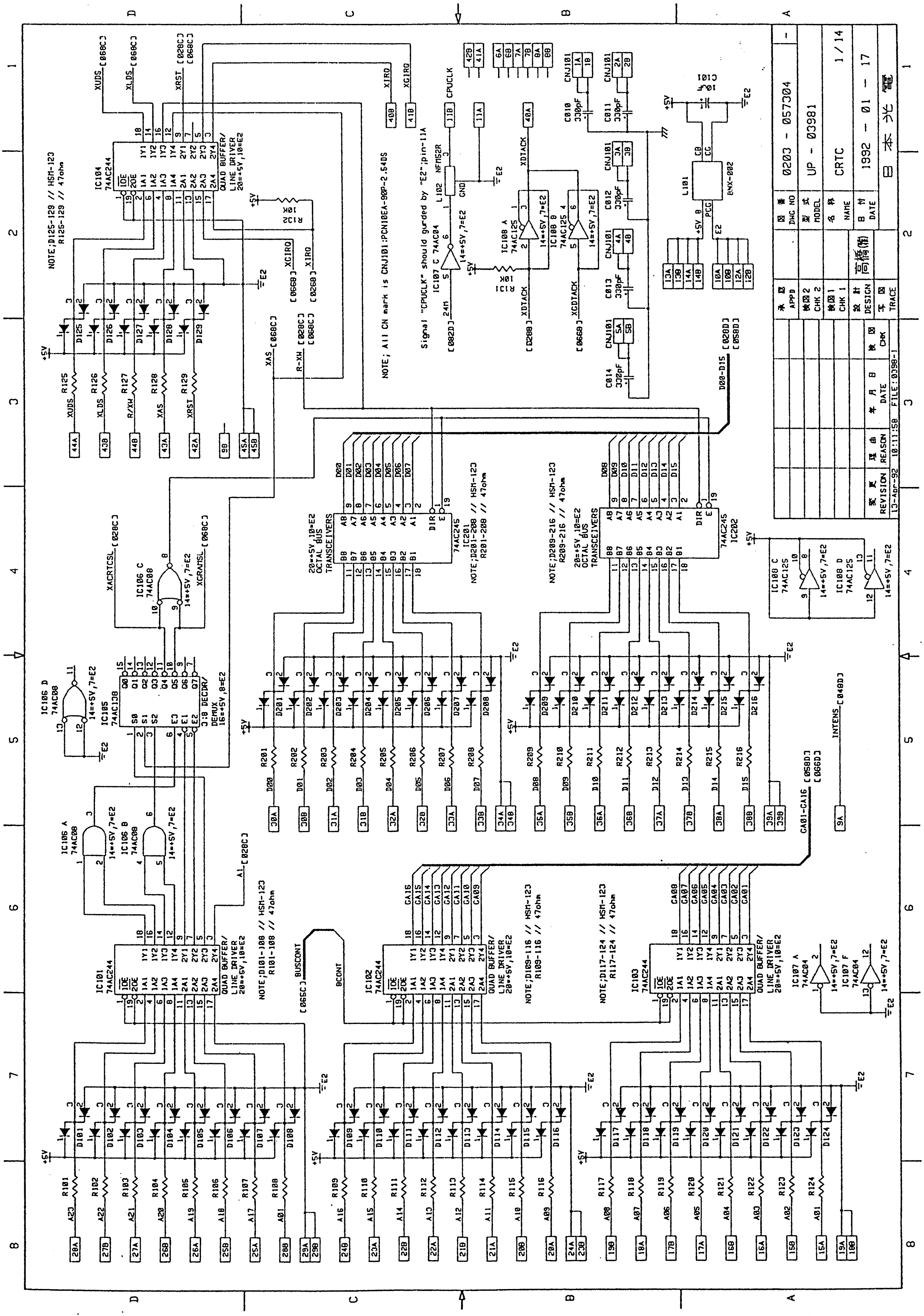
0203 - 057278
A
UP - 03971
MAIN
18 / 20
1992 - 02 - 10
日 本 光 電
図 番 DWG NO
型 式 MODEL
名 称 NAME
日 付 DATE
承 認 APPD
検図2 CHK 2
検図1 CHK 1
設 計 DESIGN
高橋(健)
写 図 TRACE
変 更 REVISION
理 由 REASON
年 月 日 DATE
検 図 CHK
13-Apr-92 09:57:53 FILE:0397-18
NOTE; J005 // PS-22PLD-D4LT1-FL
TO FRONT PANNEL
SND [054D]
R811 47
C806 0.0047uF
R810 20KF
IC816 A uPC812
+8V
-8V
R807 100K
R808 10K
R809 10K
IC815 C 74HC00
14=+5V,7=E2
+5V
C805 0.01uF
IC815 B 74HC00
R812 2KF
R813 2KF
R806 30.1KF
IC815 A 74HC00
R805 499KF
[054D] CLICK
[171C] ALMSND
[171D] HTSND
[206C] ESND
[161C] P1H
[111C] HMOUT
[192C] TX-
[192C] TX+
[192C] TY+
[192C] TY-
INTENS [075D]
KEY0 [055B]
KEY1 [055B]
KEY2 [055B]
KEY3 [055B]
KEY4 [055B]
KEY5 [055B]
J005 14
J005 16
J005 17
J005 18
J005 19
J005 20
J005 21
J005 15
J005 22
J005 10
J005 11
J005 12
J005 13
J005 1
J005 4
J005 5
J005 6
J005 7
J005 8
J005 9
J005 2
J005 3
E1
E2
+5V
A
B
C
D
1
2
3
4
5
6
7
8


0203 - 057287
A
UP - 03971
MAIN
19 / 20
1992 - 01 - 17
日本光電
図番 DWG NO
型式 MODEL
名称 NAME
日付 DATE
承認 APPD
検図2 CHK 2
検図1 CHK 1
設計 DESIGN
高橋
写図 TRACE
変更 REVISION
理由 REASON
年月日 DATE
検図 CHK
13-Apr-92 09:59:38 FILE:0397-19
TKDT [055B]
KYR [128D]
TY+ [188D]
TX+ [188D]
TX- [188C]
TY- [188D]
TKYY [158A]
TKYX [158A]
+5VREF [081D]
TKYCONT [156D]
CKY1 [082C]
CKY2 [082C]
CKY3 [092C]
IC337 B HA17903
IC820 A uPC812
IC820 B uPC812
IC821 A uPC812
IC821 B uPC812
IC822 A 4053
IC822 B 4053
IC822 C 4053
IC823 A 4053
IC823 B 4053
IC823 C 4053
IC822 4053
IC823 4053
R820 10KF
R821 10KF
R822 2KF
R823 1.5KF
R824 1KF
R825 100K
R826 10K
R827 10K
R828 10K
R829 10K
R830 10KF
R831 10KF
R832 10K
R833 10KF
R834 10KF
R835 10K
R836 10K
C822 0.01uF
C823 0.01uF
C824 0.01uF
D801 HSK120TR
+5V
+8V
-8V
E1
VDD
VSS
VEE
INH

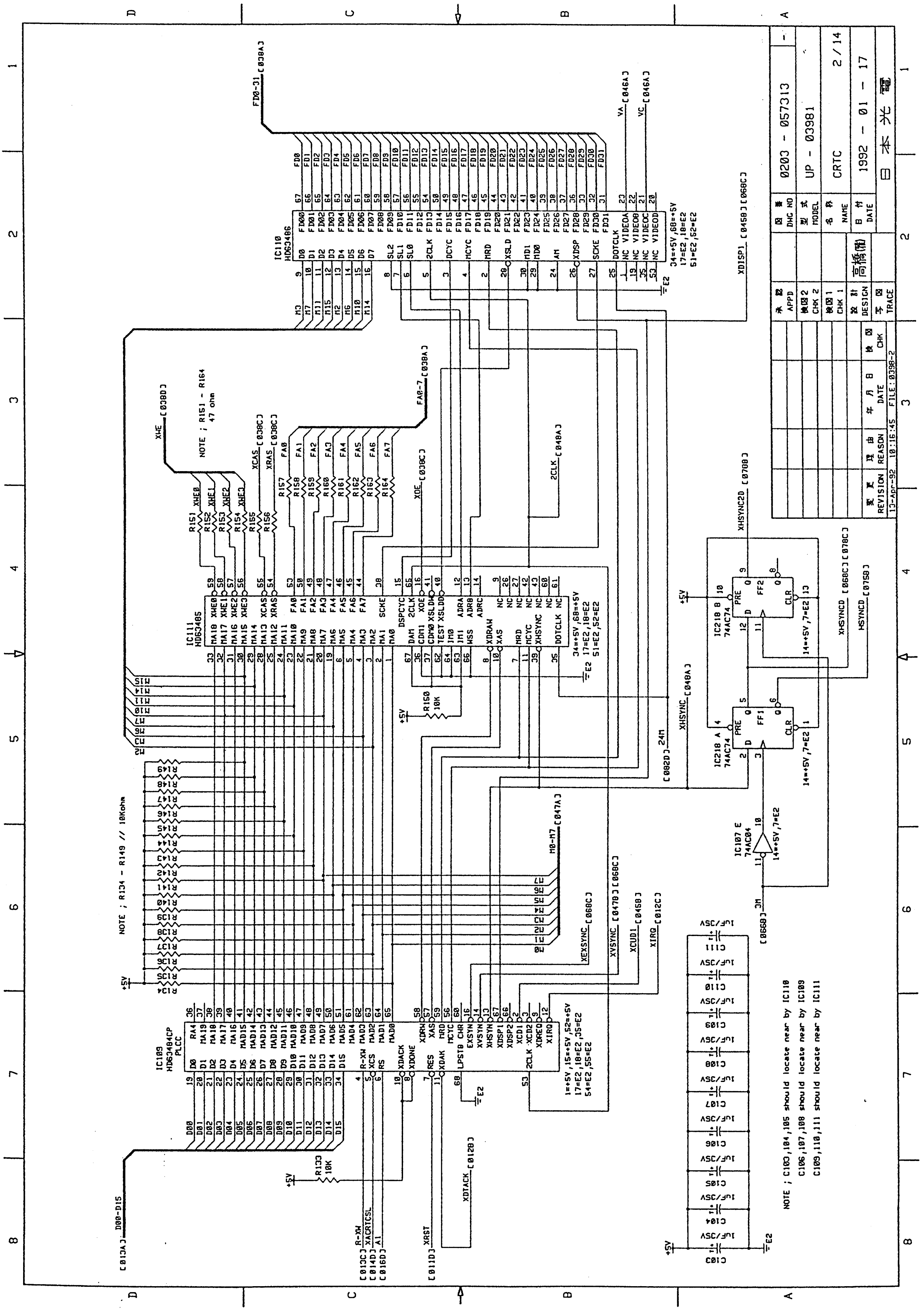

0203 - 057296
UP - 03971
MAIN
20/20
1992 - 01 - 17
日本光電
DWG NO
MODEL
NAME
DATE
APPD
CHK 2
CHK 1
DESIGN
TRACE
REVISION
REASON
DATE
CHK
13-Apr-92 18:01:20
FILE:0397-20
NOTE; J007,J008,J009
PCN10EA-90S-2.54DSA
DNX-002
BNX-002
L001
L002
L003
+5V
E2
E1
+8V
-8V
+19V
-19V
-0V
JMP1
JMP2
JMP3
JMP4
JMP5
J006
171363-1
PUMP-
PUMP+
ESND
+12VBP
+12VCRT
ECRT
MDW
RW
P1W
P2W
AUXW
HW1
HW2
R418 47
R419 47
R420 47
R421 47
I-B ECG
NFM61R30T472
0.1uF
10uF/35V

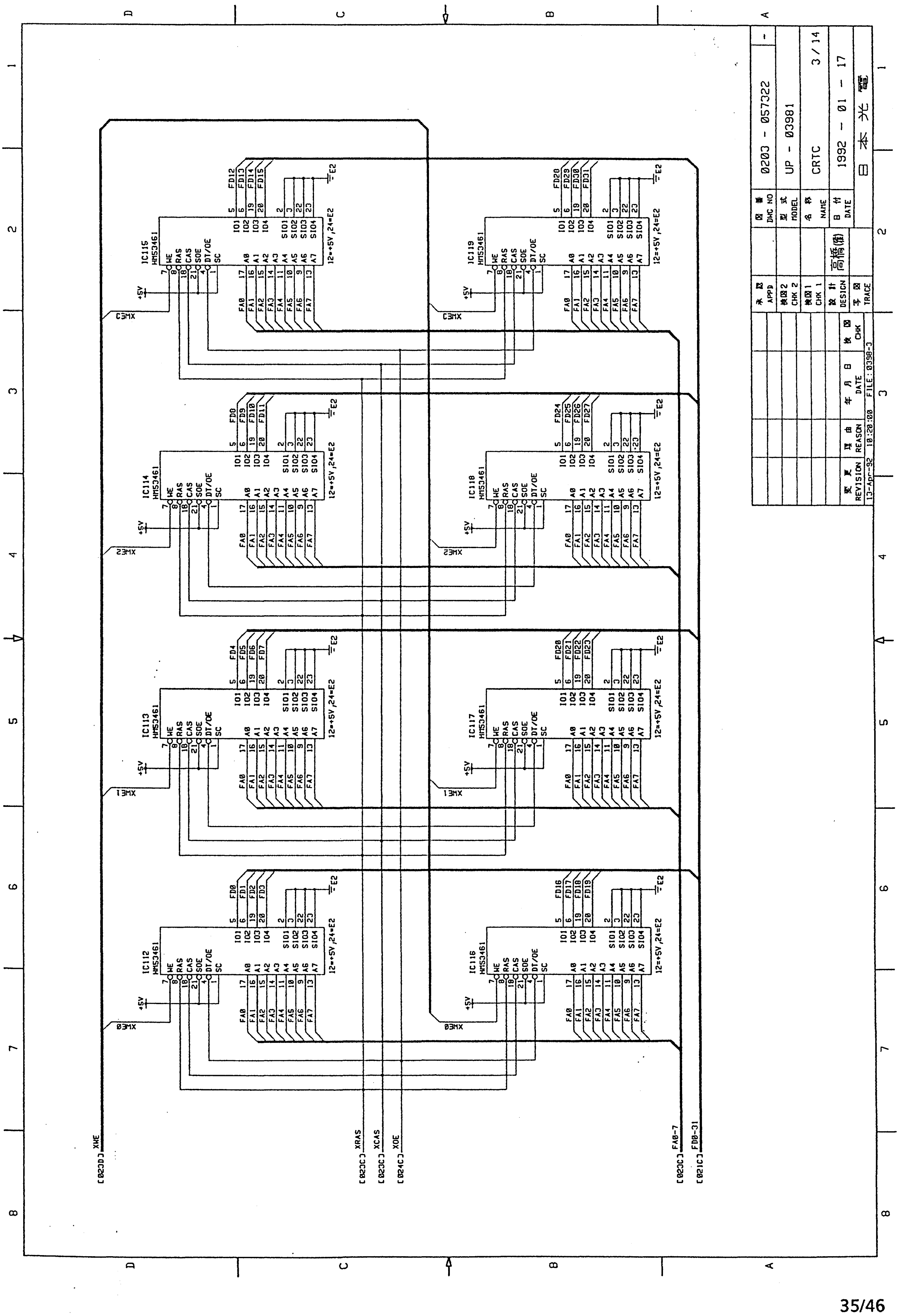

0203 - 057447
UP - 05201
ROM-PACK 1/2
1992 - 01 - 20
日本光電
DWG NO
MODEL
NAME
DATE
APPD
CHK 2
CHK 1
DESIGN 高橋
TRACE
REVISION
REASON
DATE
CHK
13-Apr-92 10:05:02
FILE: 0520-1
DATA BUS [020A]
ADDRESS BUS [020D]
XRD [020C]
XROMSL [020D]
IC013 B 74AC10
IC012 A 74AC04
IC011 74AC138
3:8 DECDR/DEMUX
16PIN=+5V
8PIN=E2
IC013 A 74AC10
IC013 C 74AC10
IC012 B 74AC04
IC012 C 74AC04
IC012 D 74AC04
IC012 E 74AC04
IC012 F 74AC04
14PIN=+5V
7PIN=E2
XROMSL1
XROMSL2
XROMSL3
XROMSL4
XROMSL5
XROMSL6
C111 0.1uF
C112 0.1uF
C113 0.1uF
C114 0.1uF
C115 0.1uF
C116 0.1uF
J101 PCN10EA-64P-2.54DS
R001 - R073 // 47 ohm
D001 - D073 // HMS-123
XINTA
R/XW
XAS
+5V
E2

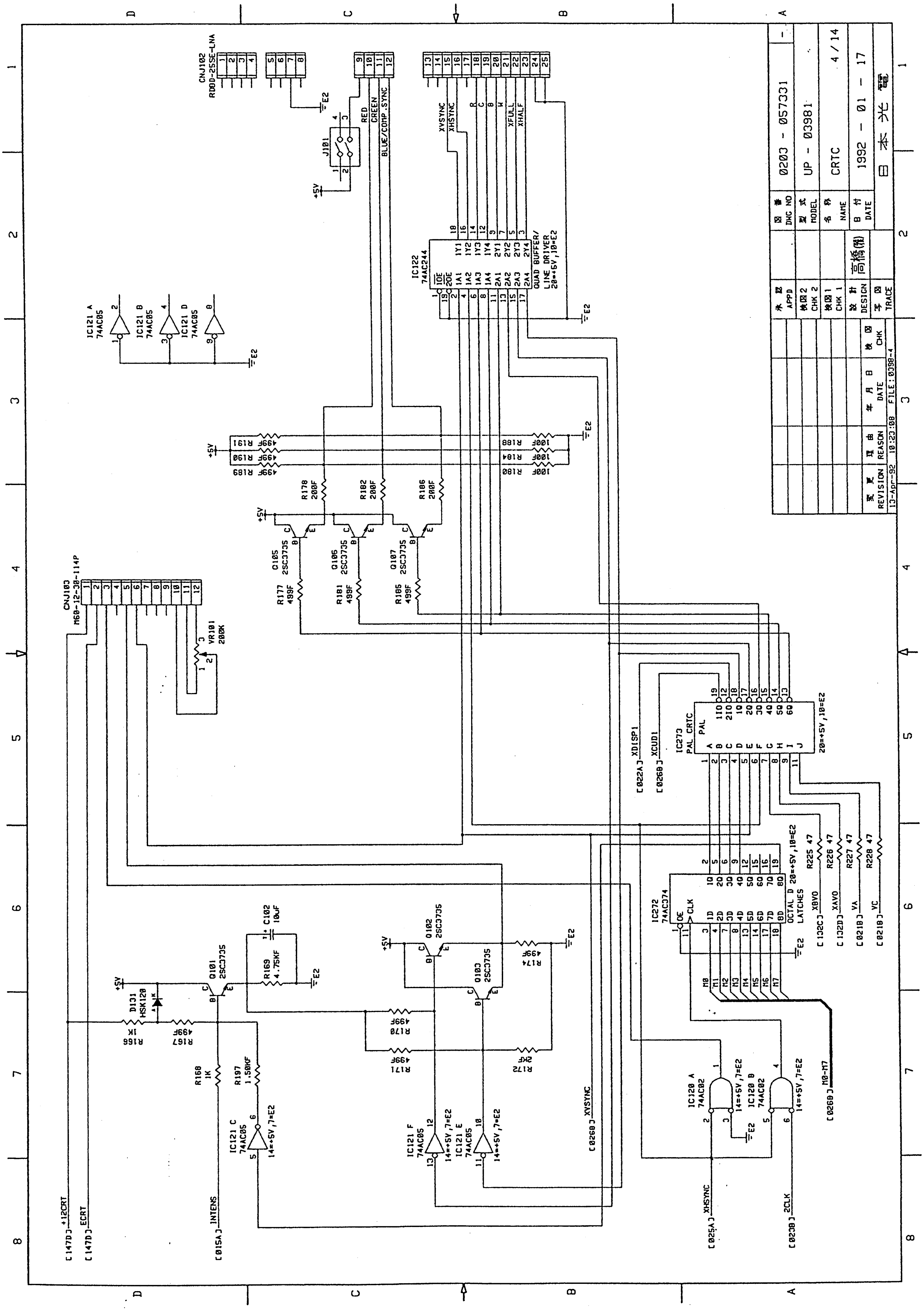

IC126 HN27C1024
IC127 HN27C1024
IC124 HN27C1024
IC125 HN27C1024
IC122 HN27C1024
IC123 HN27C1024
VPP CE OE PGM
+5V
40=+5V,11=E2,30=E2
XROMSL1
XROMSL2
XROMSL3
XROMSL4
XROMSL5
XROMSL6
ADDRESS BUS
XROMSL
XRD
DATA BUS
[016D]
[014A]
[011B]
[012D]
0203 - 057456
UP - 05201
ROM-PACK 2/2
1992 - 01 - 20
日本光電
DWG NO
MODEL
NAME
DATE
APPD
CHK 2
CHK 1
DESIGN
TRACE
高橋
REVISION
REASON
DATE
CHK
13-Apr-92 10:08:40 FILE:0520-2

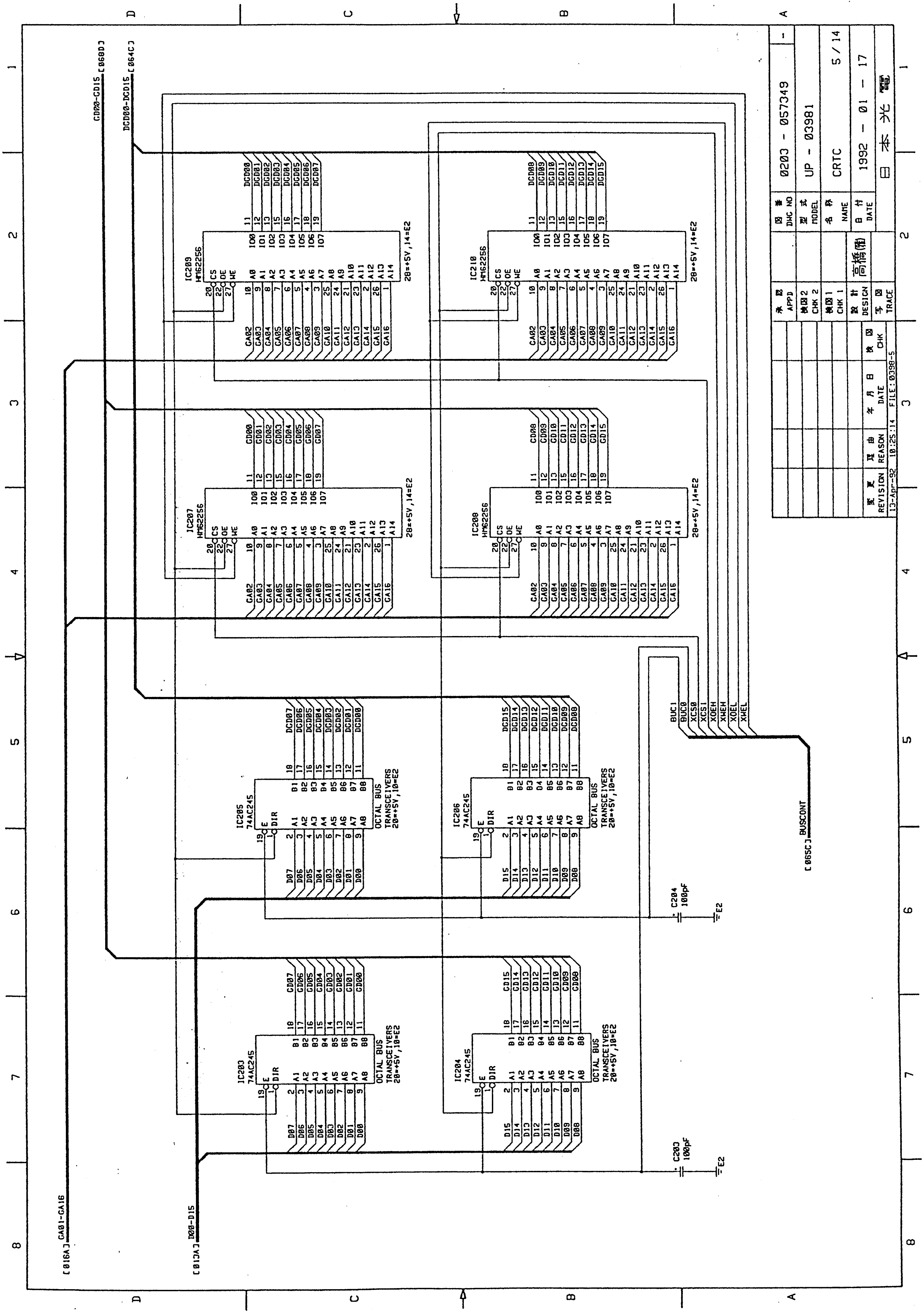

0203 - 057304
UP - 03981
CRTC
1 / 14
1992 - 01 - 17
DWG NO
MODEL
NAME
DATE
APPD
CHK 2
CHK 1
DESIGN
TRACE
REVISION
REASON
13-Apr-92
10:11:58
FILE:0398-1
IC101 74AC244
IC102 74AC244
IC103 74AC244
IC104 74AC244
IC105 74AC138
IC106 74AC08
IC107 74AC04
IC108 74AC125
IC201 74AC245
IC202 74AC245
QUAD BUFFER/ LINE DRIVER
OCTAL BUS TRANSCEIVERS
3:8 DECDR/ DEMUX
L101 BNX-002
L102 NFM52R
C101 10uF
CNJ101
NOTE; All CN mark is CNJ101:PCN10EA-90P-2.54DS
Signal "CPUCLK" should gurded by "E2":pin-11A
NOTE;D101-108 // HSM-123 R101-108 // 47ohm
NOTE;D109-116 // HSM-123 R109-116 // 47ohm
NOTE;D117-124 // HSM-123 R117-124 // 47ohm
NOTE;D125-129 // HSM-123 R125-129 // 47ohm
NOTE;D201-208 // HSM-123 R201-208 // 47ohm
NOTE;D209-216 // HSM-123 R209-216 // 47ohm
XUDS
XLDS
XRST
XIRQ
XGIRQ
CPUCLK
XDTACK
XGDTACK
XAS
R-XH
XACRTCSL
XGRAMSL
BUSCONT
BCONT
INTENS
D00-D15
CA01-CA16
A01
A23
+5V
E2
A

MANUAL CHANGE INFORMATION

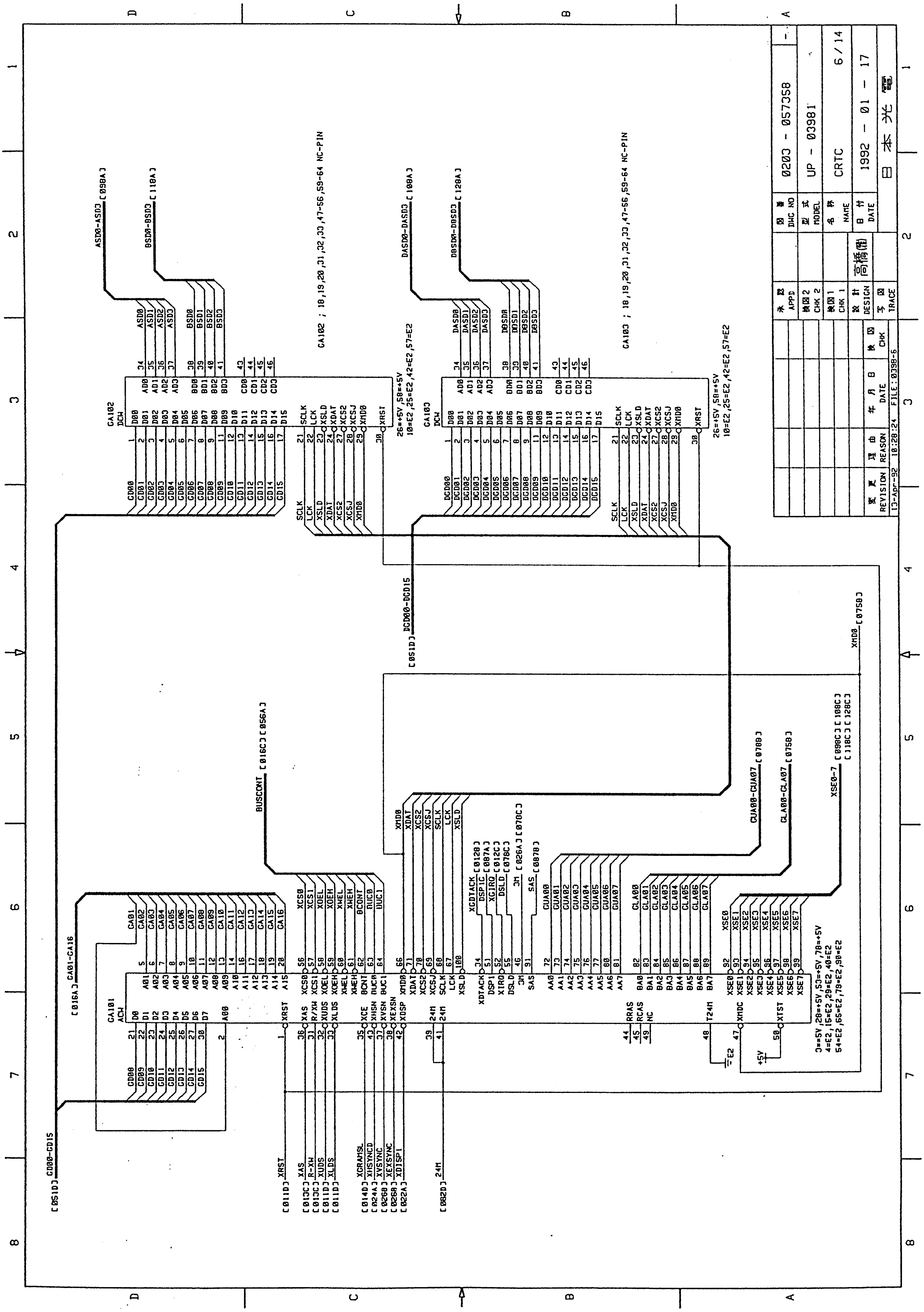

IC110 HD63486
IC111 HD63485
IC109 HD63484CP PLCC
IC218 A 74AC74
IC218 B 74AC74
IC107 E 74AC04
NOTE ; R151 - R164 47 ohm
NOTE ; R134 - R149 // 10Kohm
NOTE ; C103,104,105 should locate near by IC110
C106,107,108 should locate near by IC109
C109,110,111 should locate near by IC111
FD0-31
FA0-7
M0-M7
D00-D15
XHSYNC
XHSYNC2D
XDISP1
0203 - 057313
UP - 03981
CRTC
2 / 14
1992 - 01 - 17
13-Apr-92 10:16:45 FILE:0398-2

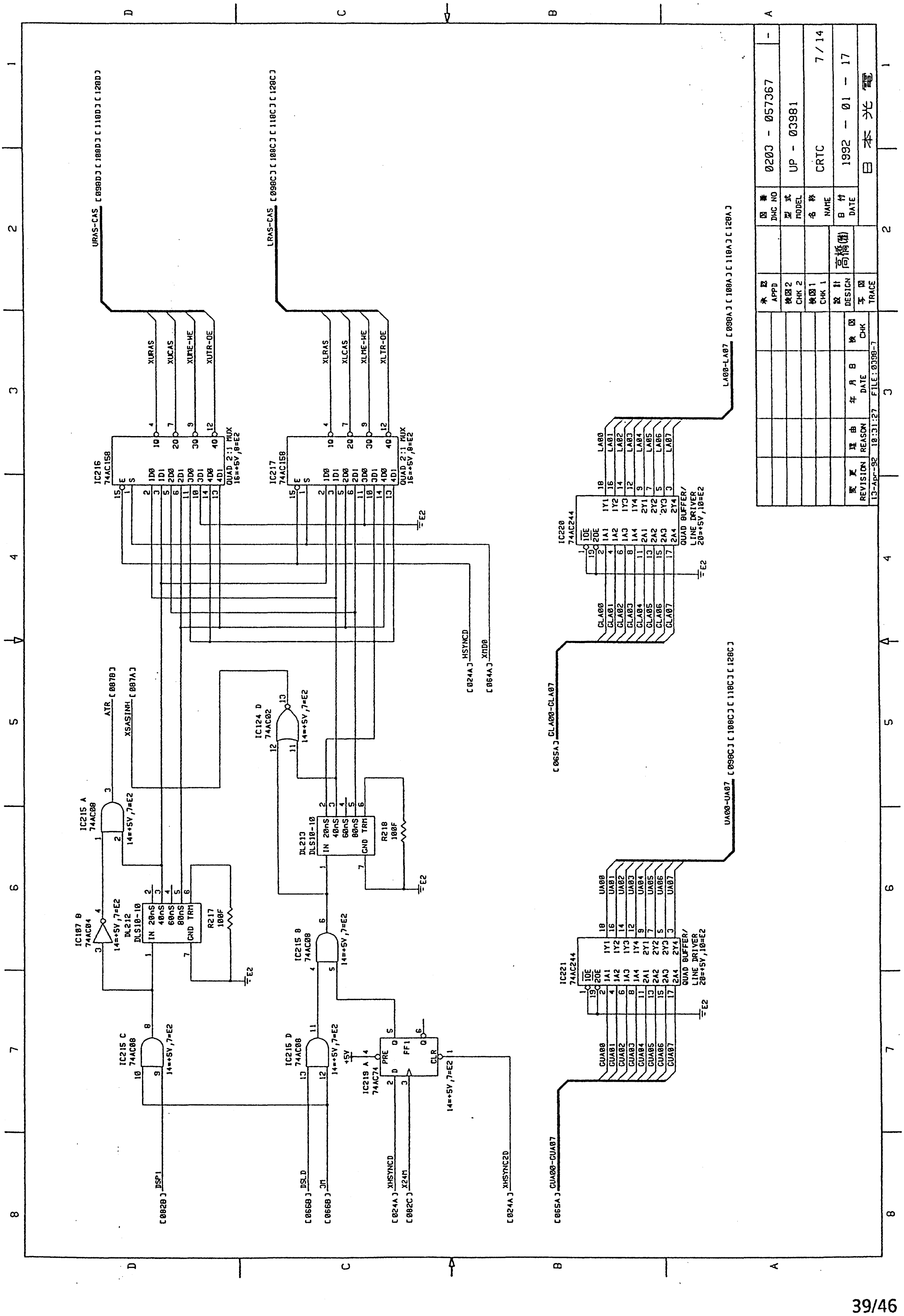

0203 - 057322
UP - 03981
CRTC
3 / 14
1992 - 01 - 17
日本光電
DWG NO
MODEL
NAME
DATE
APPD
CHK 2
CHK 1
DESIGN
TRACE
REVISION
REASON
DATE
CHK
13-Apr-92 10:20:00 FILE:0398-3
IC112
IC113
IC114
IC115
IC116
IC117
IC118
IC119
HM53461
WE
RAS
CAS
SOE
DT/OE
SC
IO1
IO2
IO3
IO4
SIO1
SIO2
SIO3
SIO4
A0
A1
A2
A3
A4
A5
A6
A7
12=+5V,24=E2
+5V
E2
FA0
FA1
FA2
FA3
FA4
FA5
FA6
FA7
FD0
FD1
FD2
FD3
FD4
FD5
FD6
FD7
FD8
FD9
FD10
FD11
FD12
FD13
FD14
FD15
FD16
FD17
FD18
FD19
FD20
FD21
FD22
FD23
FD24
FD25
FD26
FD27
FD28
FD29
FD30
FD31
XME0
XME1
XME2
XME3
XWE
XRAS
XCAS
XOE
FA0-7
FD0-31
[020D]
[020C]
[024C]
[021C]
A
B
C
D
1
2
3
4
5
6
7
8


0203 - 057331
UP - 03981
CRTC
4 / 14
1992 - 01 - 17
日本光電
図番 DWG NO
型式 MODEL
名称 NAME
日付 DATE
承認 APPD
検図2 CHK 2
検図1 CHK 1
設計 DESIGN
高橋(隆)
製図 TRACE
変更 REVISION
理由 REASON
年月日 DATE
検図 CHK
13-Apr-92 10:23:08 FILE:0398-4
CNJ102 RDDO-25SE-LNA
CNJ103 M60-12-30-114P
J101
RED
GREEN
BLUE/COMP.SYNC
XVSYNC
XHSYNC
R
G
B
W
XFULL
XHALF
IC122 74AC244 QUAD BUFFER/ LINE DRIVER 20=+5V,10=E2
IC121 A 74AC05
IC121 B 74AC05
IC121 D 74AC05
IC121 C 74AC05
IC121 E 74AC05
IC121 F 74AC05
R189 499F
R190 499F
R191 499F
R180 100F
R184 100F
R188 100F
R178 200F
R182 200F
R186 200F
Q105 2SC3735
Q106 2SC3735
Q107 2SC3735
R177 499F
R181 499F
R185 499F
VR101 200K
IC273 PAL CRTC PAL 20=+5V,10=E2
XDISP1
XCUD1
[022A]
[026B]
IC272 74AC374 OCTAL D LATCHES 20=+5V,10=E2
R225 47
R226 47
R227 47
R228 47
XBVO
XAVO
VA
VC
[132C]
[132D]
[021B]
M0-M7
[026B]
IC120 A 74AC02 14=+5V,7=E2
IC120 B 74AC02 14=+5V,7=E2
XHSYNC
[025A]
2CLK
[023B]
Q101 2SC3735
Q102 2SC3735
Q103 2SC3735
C102 10μF
R169 4.75KF
D131 HSK120
R166 1K
R167 499F
R168 1K
R197 1.50KF
R170 499F
R171 499F
R172 2KF
R174 499F
+12CRT
ECRT
[147D]
INTENS
[015A]
XVSYNC
[026B]
+5V
E2

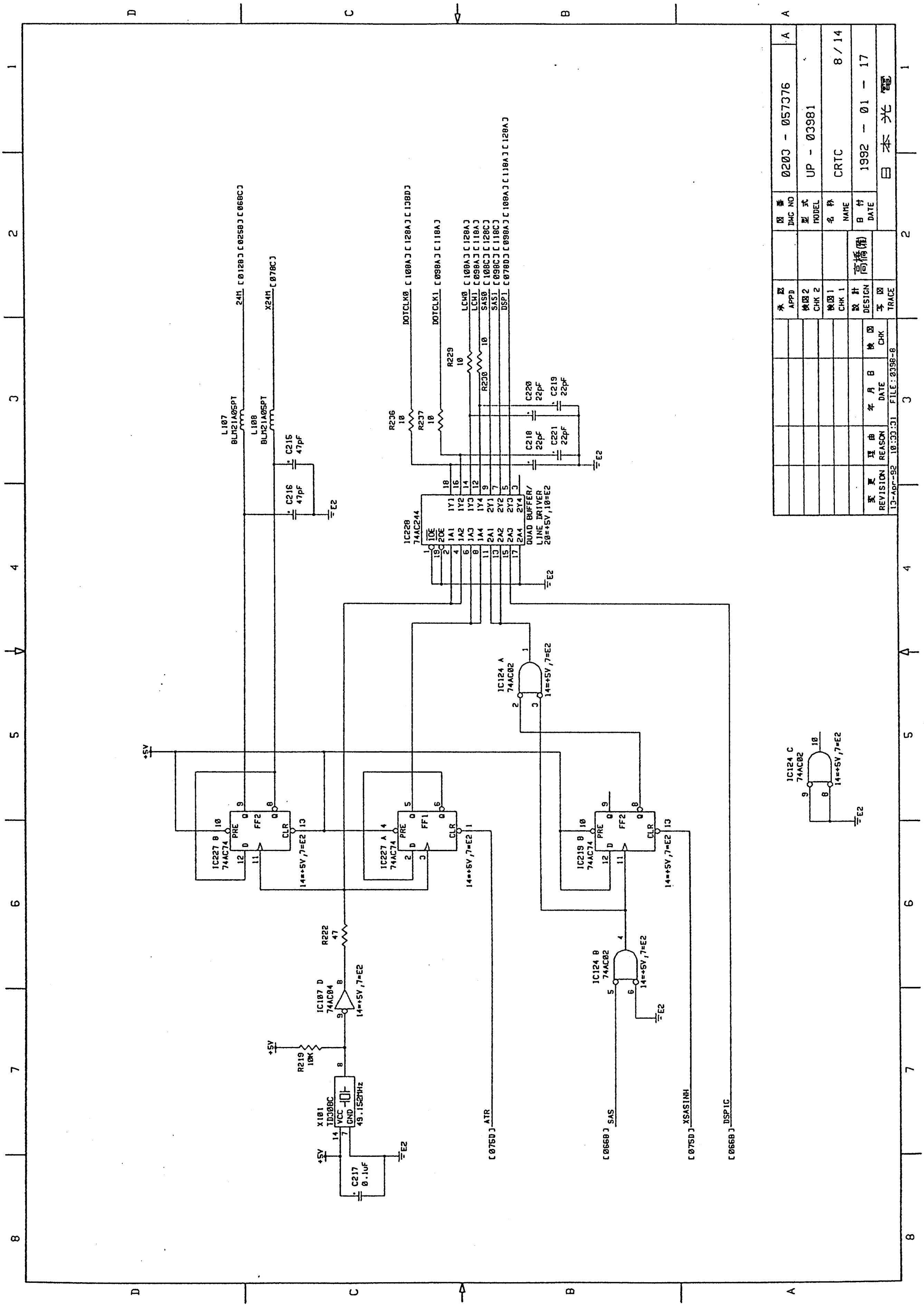

IC203
74AC245
IC204
74AC245
IC205
74AC245
IC206
74AC245
OCTAL BUS TRANSCEIVERS 20=+5V,10=E2
IC207
HM62256
IC208
HM62256
IC209
HM62256
IC210
HM62256
28=+5V,14=E2
C203 100pF
C204 100pF
E2
[016A] CA01-CA16
[013A] D00-D15
[060D] CD00-CD15
[064C] DCD00-DCD15
[065C] BUSCONT
BUC1
BUC0
XCS0
XCS1
XOEH
XWEH
XOEL
XWEL
図番 DWG NO 0203 - 057349 -
型式 MODEL UP - 03981
名称 NAME CRTC 5/14
日付 DATE 1992 - 01 - 17
日本光電
承認 APPD
検図2 CHK 2
検図1 CHK 1
設計 DESIGN 高橋
写図 TRACE
変更 REVISION
理由 REASON
年月日 DATE
検図 CHK
13-Apr-92 10:25:14 FILE:0398-5

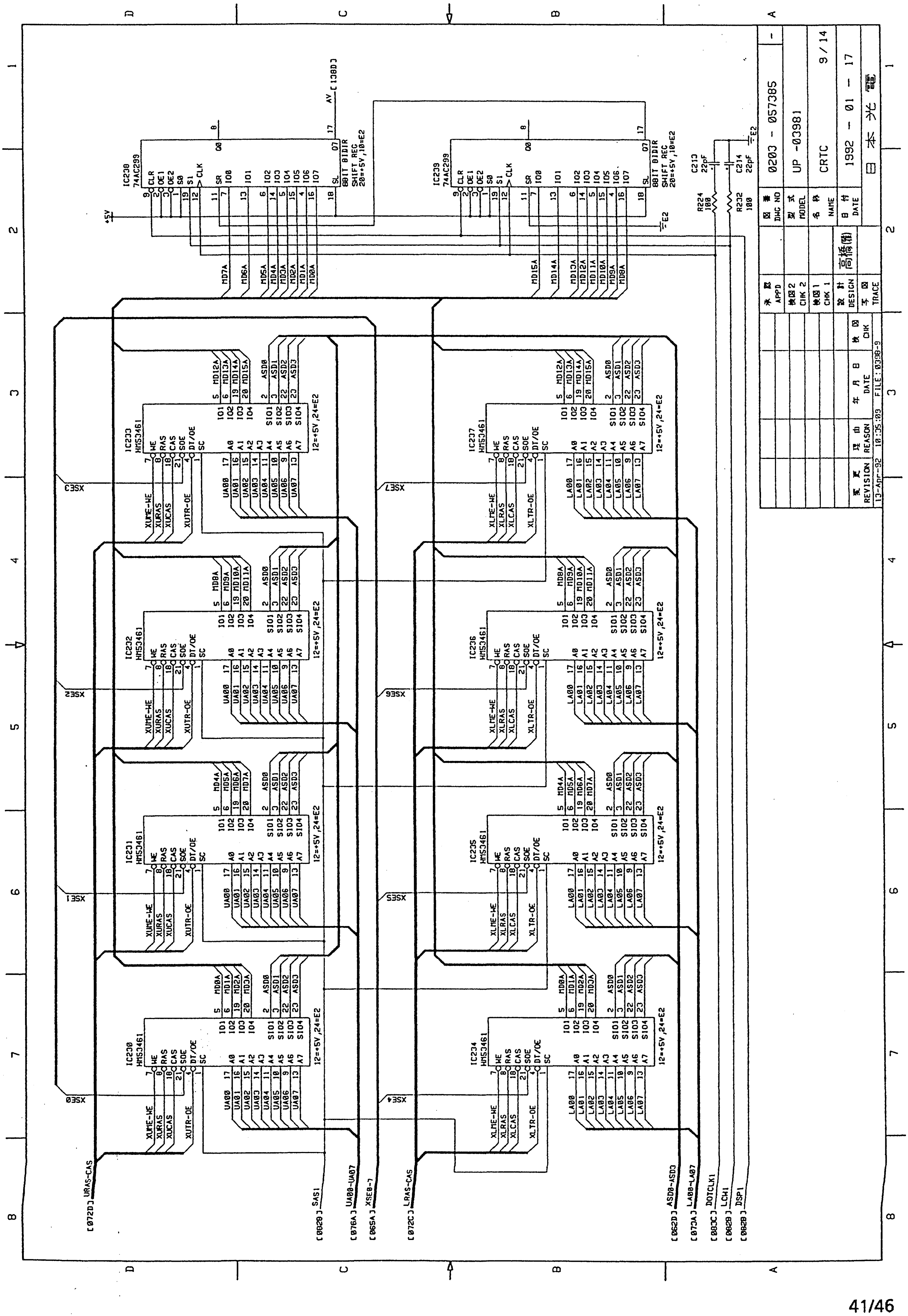
MANUAL CHANGE INFORMATION

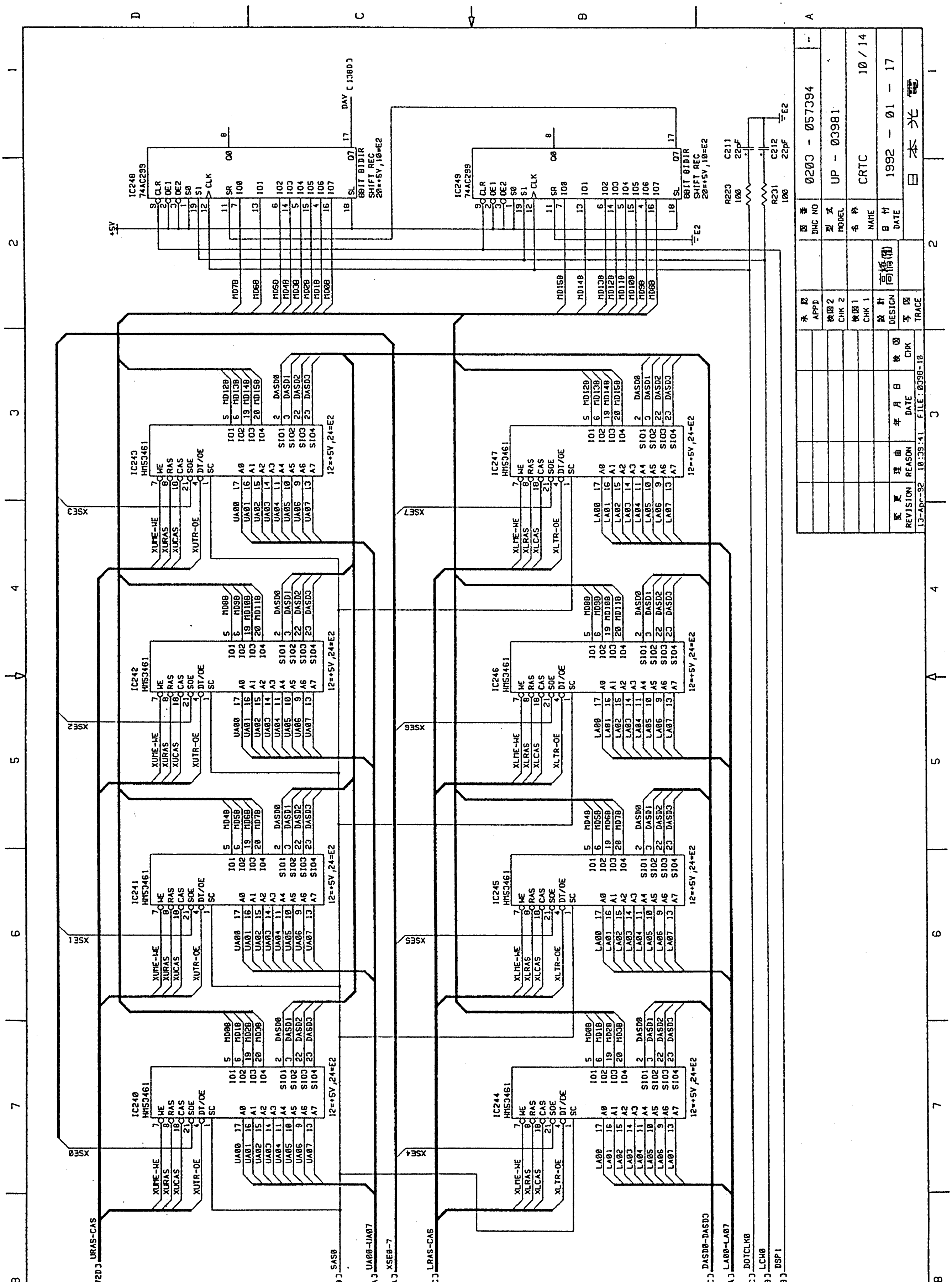

CA101
ACH
CA102
DCH
CA103
DCH
CA102 ; 18,19,20,31,32,33,47-56,59-64 NC-PIN
CA103 ; 18,19,20,31,32,33,47-56,59-64 NC-PIN
26=+5V,58=+5V
10=E2,25=E2,42=E2,57=E2
3=+5V,28=+5V,53=+5V,78=+5V
4=E2,15=E2,29=E2,40=E2
54=E2,65=E2,79=E2,90=E2
CD00-CD15
DCD00-DCD15
CA01-CA16
ASD0-ASD3
BSD0-BSD3
DASD0-DASD3
DBSD0-DBSD3
BUSCONT
CUA00-CUA07
CLA00-CLA07
XSE0-7
XMD0
XRST
24M
0203 - 057358
UP - 03981
CRTC
6 / 14
1992 - 01 - 17
日本光電
高橋
13-Apr-92 10:28:24
FILE:0398-6

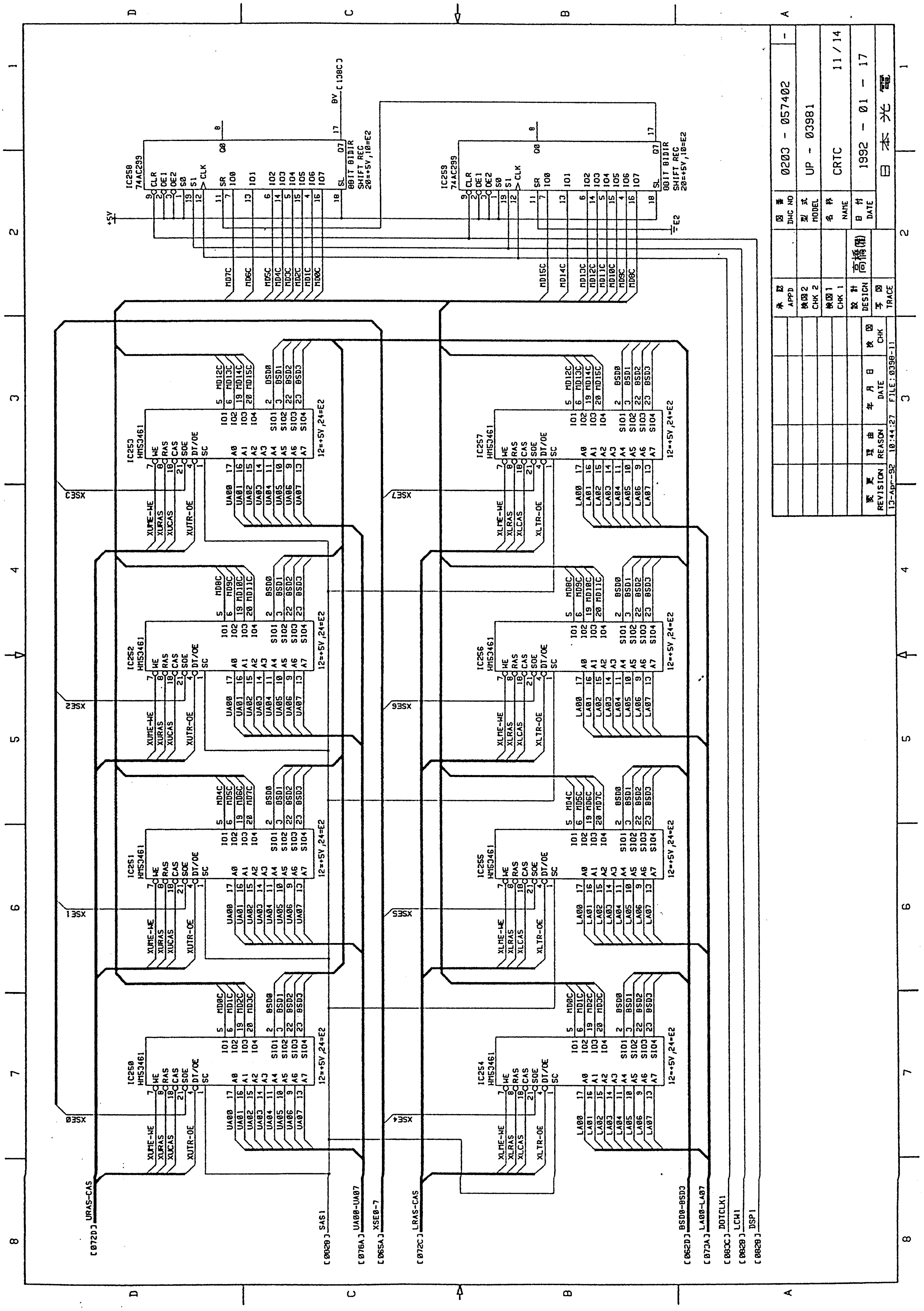

URAS-CAS [098D] [108D] [118D] [128D]
XURAS
XUCAS
XUME-WE
XUTR-OE
LRAS-CAS [098C] [108C] [118C] [128C]
XLRAS
XLCAS
XLME-WE
XLTR-OE
IC216 74AC158
IC217 74AC158
QUAD 2:1 MUX 16=+5V,8=E2
LA00-LA07 [098A] [108A] [118A] [128A]
IC220 74AC244
IC221 74AC244
QUAD BUFFER/ LINE DRIVER 20=+5V,10=E2
GLA00-GLA07 [065A]
UA00-UA07 [098C] [108C] [118C] [128C]
GUA00-GUA07 [065A]
[024A] HSYNCD
[064A] XMD0
ATR [087B]
XSASINH [087A]
IC124 D 74AC02
IC215 A 74AC08
IC187 B 74AC04
DL212 DLS10-10
DL213 DLS10-10
IN 20nS 40nS 60nS 80nS GND TRM
R217 100F
R218 100F
IC215 B 74AC08
IC215 C 74AC08
IC215 D 74AC08
IC219 A 74AC74
PRE D Q FF1 CLR
14=+5V,7=E2
+5V
[082B] DSP1
[066B] DSLD
[066B] JM
[024A] XHSYNCD
[082C] X24M
[024A] XHSYNC2D
E2
図 番 DWG NO 0203 - 057367 -
型 式 MODEL UP - 03981
名 称 NAME CRTC 7 / 14
日 付 DATE 1992 - 01 - 17
日 本 光 電
承 認 APPD
検図2 CHK 2
検図1 CHK 1
設 計 DESIGN 高橋(健)
写 図 TRACE
変 更 REVISION
理 由 REASON
年 月 日 DATE
検 図 CHK
13-Apr-92 10:31:27 FILE:0398-7

MANUAL CHANGE INFORMATION

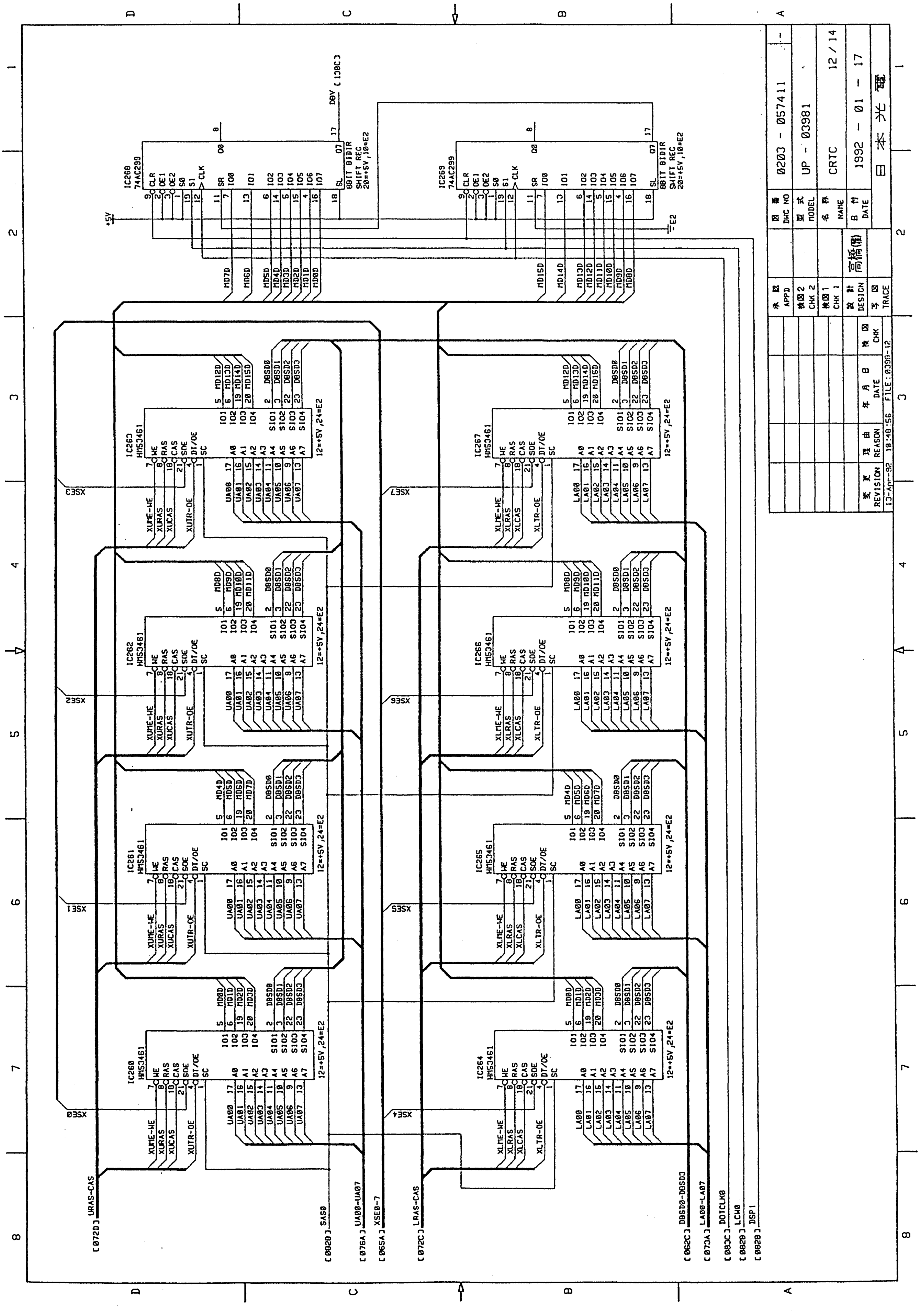

0203 - 057376
UP - 03981
CRTC
8 / 14
1992 - 01 - 17
日本光電
DWG NO
MODEL
NAME
DATE
APPD
CHK 2
CHK 1
DESIGN
TRACE
REVISION
REASON
DATE
CHK
13-Apr-92
10:33:31
FILE:0398-8
IC228
74AC244
QUAD BUFFER/
LINE DRIVER
20=+5V,10=E2
IC227 A
74AC74
IC227 B
74AC74
IC219 B
74AC74
FF1
FF2
PRE
CLR
IC124 A
74AC02
IC124 B
74AC02
IC124 C
74AC02
14=+5V,7=E2
IC107 D
74AC04
X101
TD308C
49.152MHz
R222
47
R219
10K
C217
0.1uF
L107
BLM21A05PT
L108
BLM21A05PT
C215
47pF
C216
47pF
C218
22pF
C219
22pF
C220
22pF
C221
22pF
R229
10
R230
10
R236
10
R237
10
24M [012B][025B][068C]
X24M [078C]
DOTCLK0 [100A][128A][130D]
DOTCLK1 [098A][118A]
LCH0 [100A][128A]
LCH1 [098A][118A]
SAS0 [108C][128C]
SAS1 [098C][118C]
DSP1 [078D][098A][108A][118A][128A]
[075D] ATR
[066B] SAS
[075D] XSASINH
[066B] DSPIC
+5V
E2

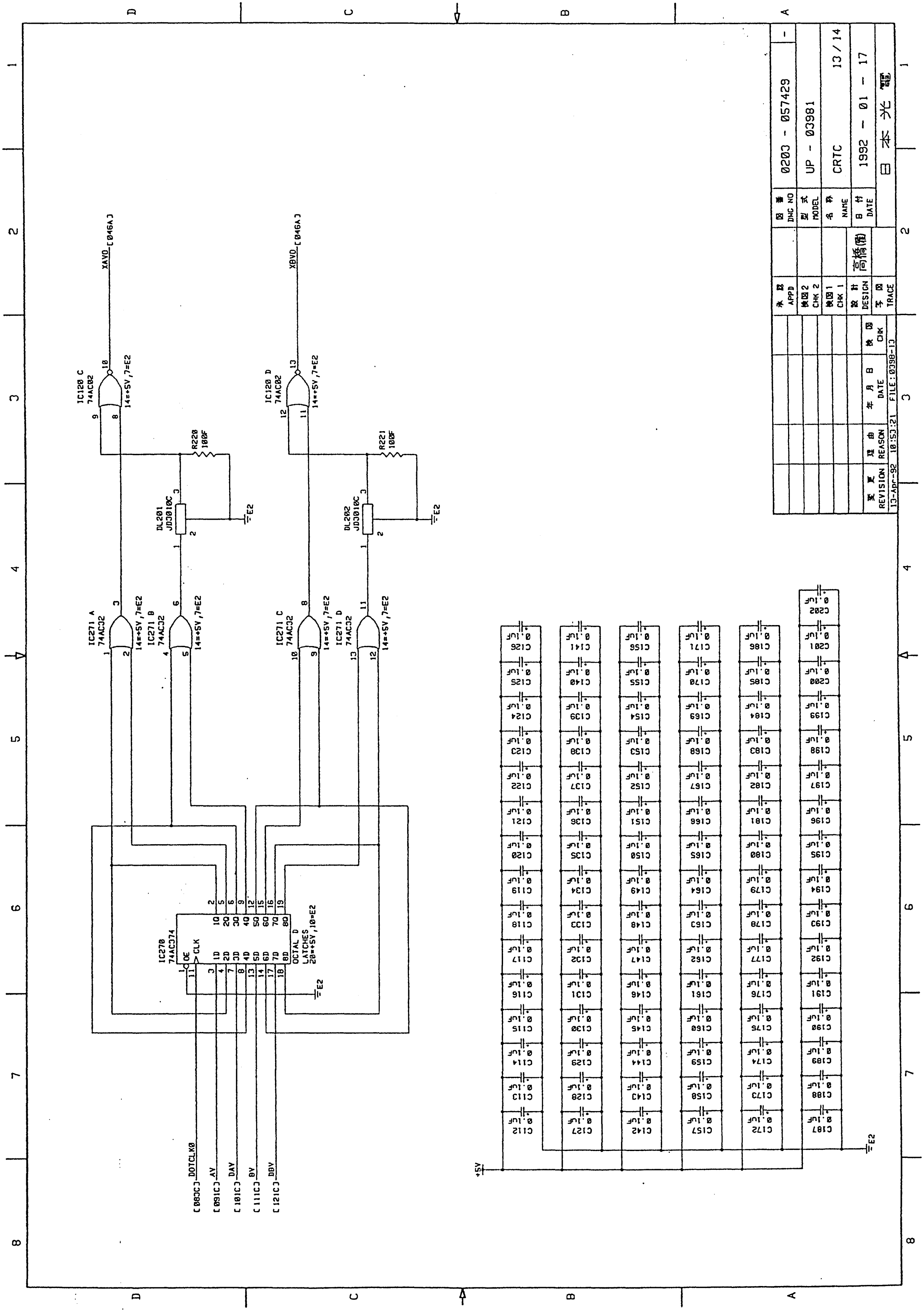

0203 - 057385
UP -03981
CRTC
9 / 14
1992 - 01 - 17
日本光電
図番 DWG NO
型式 MODEL
名称 NAME
日付 DATE
承認 APPD
検図2 CHK 2
検図1 CHK 1
設計 DESIGN
写図 TRACE
高橋
変更 REVISION
理由 REASON
年月日 DATE
検図 CHK
13-Apr-92 10:35:09 FILE:0398-9
IC238 74AC299
IC239 74AC299
8BIT BIDIR SHIFT REG 20=+5V,10=E2
AV [130D]
+5V
E2
R224 100
R232 100
C213 22pF
C214 22pF
IC230 HM53461
IC231 HM53461
IC232 HM53461
IC233 HM53461
IC234 HM53461
IC235 HM53461
IC236 HM53461
IC237 HM53461
12=+5V,24=E2
XUME-WE
XURAS
XUCAS
XUTR-OE
XLME-WE
XLRAS
XLCAS
XLTR-OE
XSE0
XSE1
XSE2
XSE3
XSE4
XSE5
XSE6
XSE7
MD0A
MD1A
MD2A
MD3A
MD4A
MD5A
MD6A
MD7A
MD8A
MD9A
MD10A
MD11A
MD12A
MD13A
MD14A
MD15A
ASD0
ASD1
ASD2
ASD3
[072D] URAS-CAS
[082D] SAS1
[076A] UA00-UA07
[065A] XSE0-7
[072C] LRAS-CAS
[062D] ASD0-ASD3
[073A] LA00-LA07
[083C] DOTCLK1
[082B] LCH1
[082B] DSP1


IC240 HM53461
IC241 HM53461
IC242 HM53461
IC243 HM53461
IC244 HM53461
IC245 HM53461
IC246 HM53461
IC247 HM53461
IC248 74AC299
IC249 74AC299
8BIT BIDIR SHIFT REG 20=+5V,10=E2
12=+5V,24=E2
DAV [130D]
R223 100
R231 100
C211 22pF
C212 22pF
[072D] URAS-CAS
[002D] SAS0
[076A] UA00-UA07
[065A] XSE0-7
[072C] LRAS-CAS
[062C] DASD0-DASD3
[073A] LA00-LA07
[083C] DOTCLK0
[082B] LCH0
[082B] DSP1
XUWE-WE
XURAS
XUCAS
XUTR-OE
XLWE-WE
XLRAS
XLCAS
XLTR-OE
0203 - 057394
UP - 03981
CRTC
10 / 14
1992 - 01 - 17
日本光電
13-Apr-92 10:39:41 FILE: 0398-10

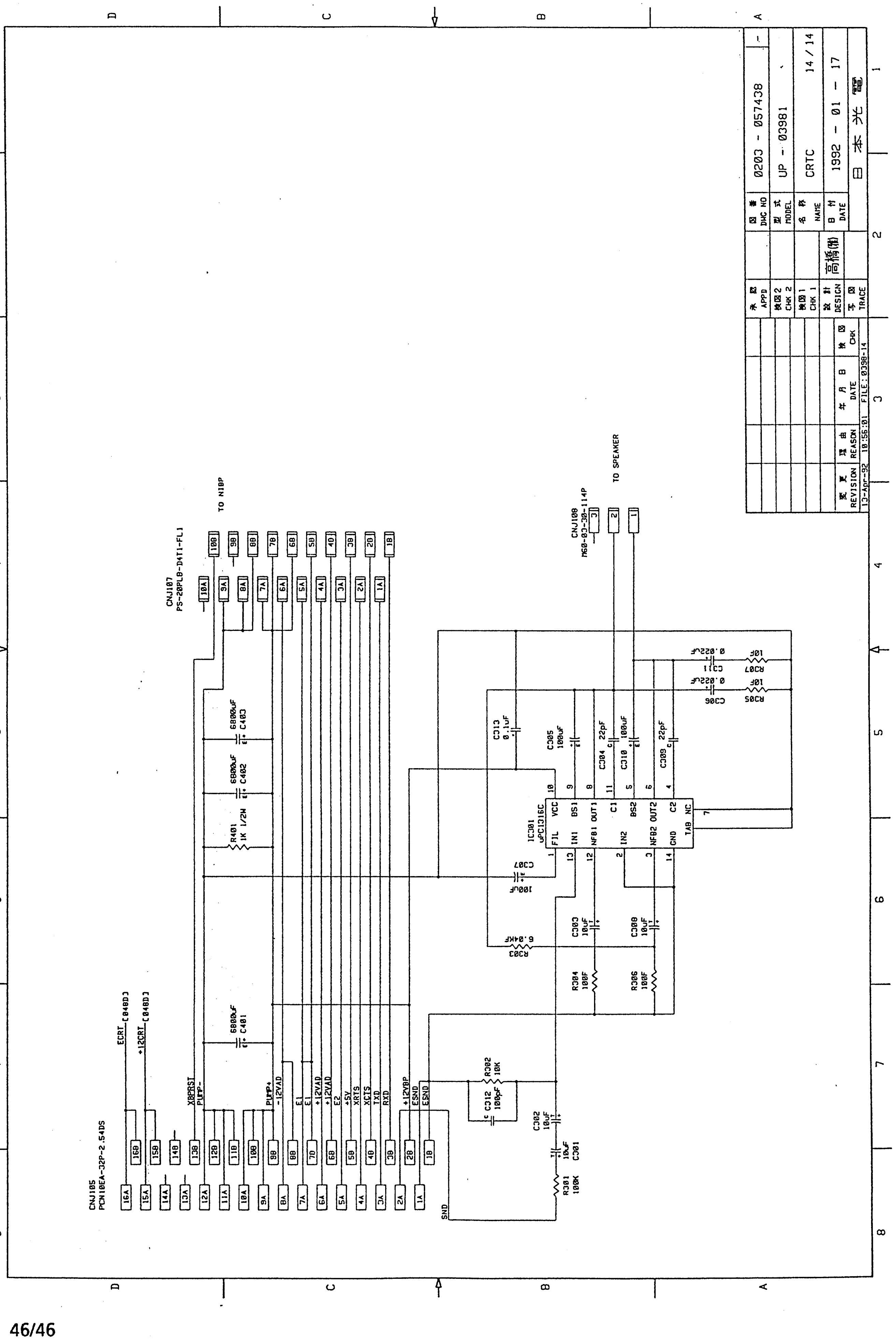

IC250 HM53461
IC251 HM53461
IC252 HM53461
IC253 HM53461
IC254 HM53461
IC255 HM53461
IC256 HM53461
IC257 HM53461
IC258 74AC299
IC259 74AC299
8BIT BIDIR SHIFT REG 20=+5V,10=E2
12=+5V,24=E2
XUWE-WE
XURAS
XUCAS
XUTR-OE
XLWE-WE
XLRAS
XLCAS
XLTR-OE
XSE0
XSE1
XSE2
XSE3
XSE4
XSE5
XSE6
XSE7
BV
URAS-CAS
SAS1
UA00-UA07
XSE0-7
LRAS-CAS
BSD0-BSD3
LA00-LA07
DOTCLK1
LCH1
DSP1
0203 - 057402
UP - 03981
CRTC
11/14
1992 - 01 - 17
日本光電
高橋(宏)
13-Apr-92 10:44:27 FILE:0398-11
REVISION
REASON
DATE
CHK
APPD
DWG NO
CHK 2
MODEL
CHK 1
NAME
DESIGN
DATE
TRACE

MANUAL CHANGE INFORMATION


IC260 74AC299
IC269 74AC299
8BIT BIDIR SHIFT REC 20=+5V,10=E2
DBV [13BC]
IC260 HM53461
IC261 HM53461
IC262 HM53461
IC263 HM53461
IC264 HM53461
IC265 HM53461
IC266 HM53461
IC267 HM53461
12=+5V,24=E2
XUME-WE
XURAS
XUCAS
XUTR-OE
XLME-WE
XLRAS
XLCAS
XLTR-OE
XSE0
XSE1
XSE2
XSE3
XSE4
XSE5
XSE6
XSE7
[072D] URAS-CAS
[082B] SAS0
[076A] UA00-UA07
[065A] XSE0-7
[072C] LRAS-CAS
[062C] DBSD0-DBSD3
[073A] LA00-LA07
[083C] DOTCLK0
[082B] LCH0
[082B] DSP1
0203 - 057411
UP - 03981
CRTC
12 / 14
1992 - 01 - 17
日本光電
図番 DHC NO
型式 MODEL
名称 NAME
日付 DATE
承認 APPD
検図2 CHK 2
検図1 CHK 1
設計 DESIGN
写図 TRACE
高橋(健)
変更 REVISION
理由 REASON
年月日 DATE
検図 CHK
13-Apr-92 18:40:56 FILE:0390-12


0203 - 057429
UP - 03981
CRTC
13 / 14
1992 - 01 - 17
日本光電
図番 DWG NO
型式 MODEL
名称 NAME
日付 DATE
承認 APPD
検図2 CHK 2
検図1 CHK 1
設計 DESIGN
写図 TRACE
高橋
変更 REVISION
理由 REASON
年月日 DATE
検図 CHK
13-Apr-92 10:53:21 FILE:0398-13
XAVO [046A]
XBVO [046A]
IC120 C 74AC02
IC120 D 74AC02
14=+5V,7=E2
R220 100F
R221 100F
DL201 JD3010C
DL202 JD3010C
IC271 A 74AC32
IC271 B 74AC32
IC271 C 74AC32
IC271 D 74AC32
IC270 74AC374
OCTAL D LATCHES
20=+5V,10=E2
OE
CLK
DOTCLK0 [080C]
AV [091C]
DAV [101C]
BV [111C]
DBV [121C]
+5V
E2
0.1uF
C112 – C202

MANUAL CHANGE INFORMATION


0203 - 057438
UP - 03981
CRTC
14 / 14
1992 - 01 - 17
日本光電
DWG NO
MODEL
NAME
DATE
APPD
CHK 2
CHK 1
DESIGN
高橋
TRACE
REVISION
REASON
DATE
CHK
13-Apr-92 10:56:01 FILE: 0398-14
CNJ105
PCN10EA-32P-2.54DS
CNJ107
PS-20PL0-D4T1-FL1
TO NIBP
CNJ108
M60-03-30-114P
TO SPEAKER
IC301
uPC1316C
ECRT [04BD]
+12CRT [04BD]
XBPRST
PUMP-
PUMP+
-12VAD
E1
+12VAD
E2
+5V
XRTS
XCTS
TXD
RXD
+12VBP
ESND
SND
C401 6800uF
C402 6800uF
C403 6800uF
R401 1K 1/2W
C307 100uF
R303 6.04KF
C303 10uF
C308 10uF
R304 100F
R306 100F
R302 10K
C312 100pF
C302 10uF
C301 10uF
R301 100K
C313 0.1uF
C305 100uF
C304 22pF
C310 100uF
C309 22pF
C306 0.022uF
C311 0.022uF
R305 10F
R307 10F
FIL VCC BS1 OUT1 C1 BS2 OUT2 C2
IN1 NFB1 IN2 NFB2 GND TAB NC

0634-000059A

MANUAL CHANGE INFORMATION

Model	Main Unit	Starting Serial No.	Software Revision
BSM-8301A/J/K	MU-831RA	00986	A3-01
	MU-831RJ	00111	A3-01
	MU-831RK	00801	A3-01
BSM-8302A/J/K	MU-832RA	00098	A3-01
	MU-832RJ	00181	A3-01
	MU-832RK	00216	A3-01

The optional interface unit QI-813P can be installed into the BSM-8300 Series of the above software revision.

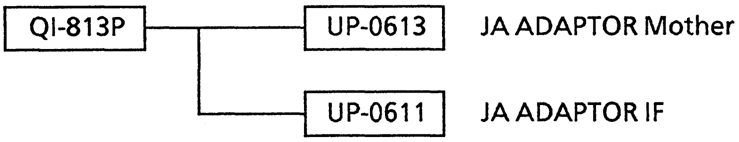
1 General

The optional interface unit QI-813P enables the BSM-8300 Series bedside monitors to be linked directly to an external input box JA-800PA/PJ, -810PA/PJ, -860PA.

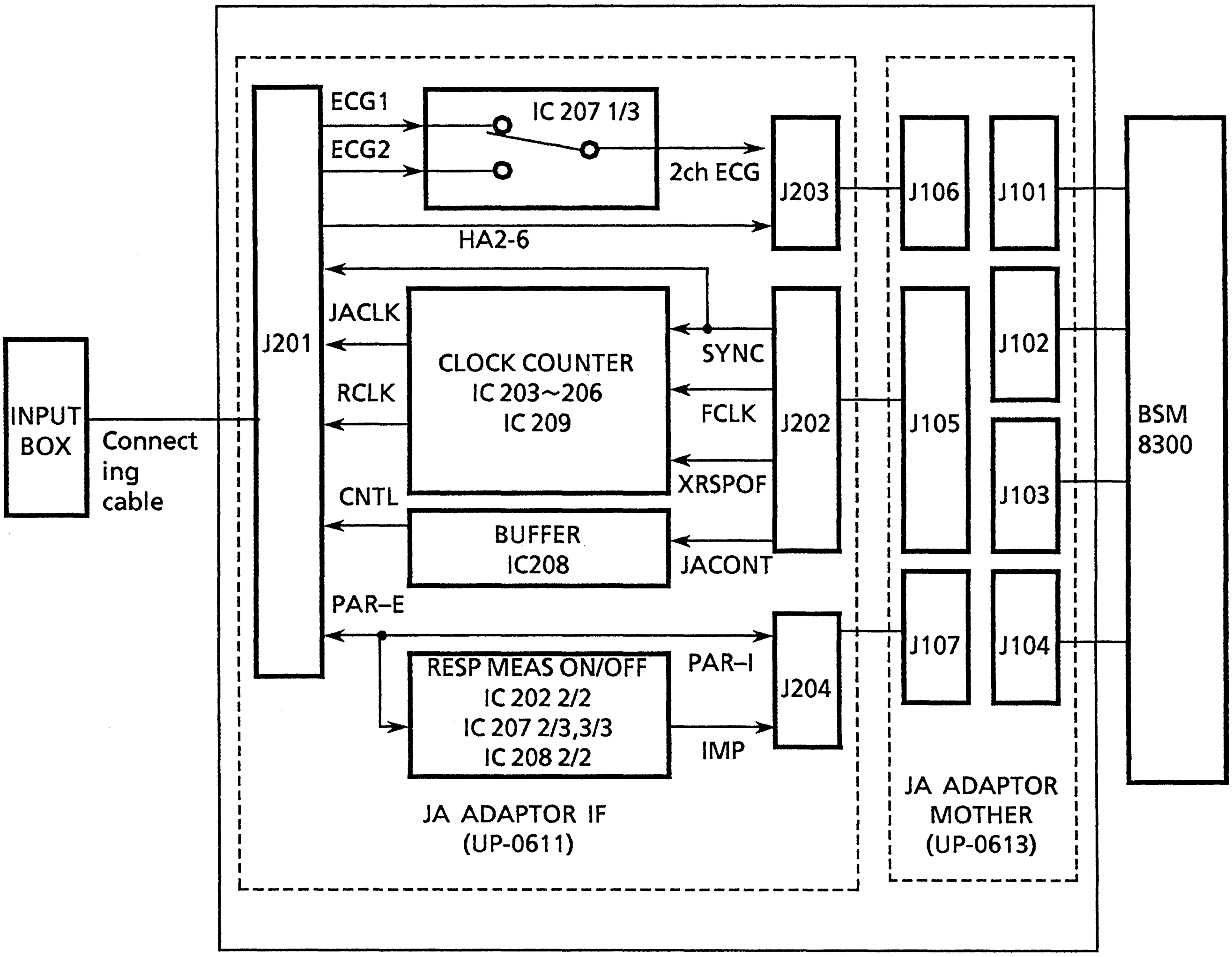
This unit QI-813P has the following function:

- the two ECG signals from the input box are time-shared into one ECG signal before being sent to the BSM-8300 bedside monitor.
- it generates the input box control signal from the clock signal of the BSM-8300 bedside monitor.
- it generates the respiration measurement ON/OFF status signal from the PARA signal and sends it to the BSM-8300 bedside monitor.
- it stops sending the respiration detection clock signal to the input box when the the respiration measurement status is OFF.
- it supplies the power and control signal to the input box and receives the status signal and the amplifier output signals from the input box.

2 COMPOSITION


QI-813P
UP-0613
JA ADAPTOR Mother
UP-0611
JA ADAPTOR IF

3 QI-813P Block Diagram


INPUT BOX
Connecting cable
J201
ECG1
ECG2
IC 207 1/3
2ch ECG
HA2-6
J203
JACLK
CLOCK COUNTER
IC 203~206
IC 209
RCLK
SYNC
FCLK
XRSPOF
J202
CNTL
BUFFER
IC208
JACONT
PAR-E
RESP MEAS ON/OFF
IC 202 2/2
IC 207 2/3,3/3
IC 208 2/2
PAR-I
IMP
J204
JA ADAPTOR IF
(UP-0611)
J106
J105
J107
J101
J102
J103
J104
JA ADAPTOR
MOTHER
(UP-0613)
BSM
8300

4 Signal List

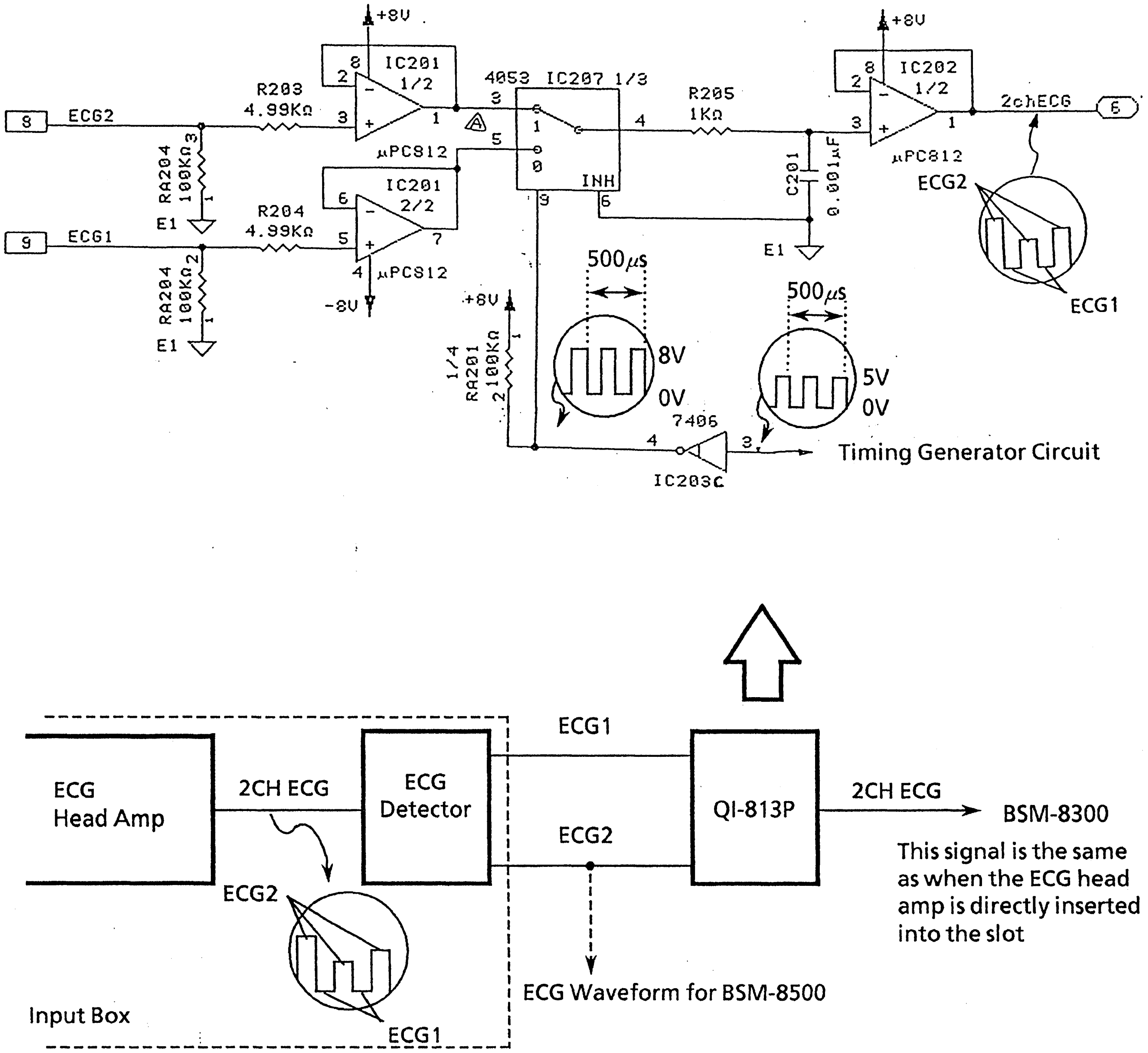
Prefix "X" means negative logic.
For example: A/XM
High level (5V): Address recognition signal (active-high)
Low level (0V) : Message recognition signal (active-low)
If a signal is not found, search the symbol from "X + signal name" lists.
If a signal "X + symbol" is not found, search the symbol from "signal name-X".

Symbol	Function	Direction
2 ch ECG	Time-shared ECG signals	to BSM main unit
CNTL	Input box control	to Input box
ECG1	ECG 1 waveform (15 mV/V)	from Input box
ECG2	ECG 2 waveform (15 mV/V)	from Input box
E1	Ground for analog circuits	
E3	Ground for digital circuits	
EH	Ground for head amplifier	
EP	Ground for NIBP head amplifier	
ER	Ground for respiration measurement	
FCLK	Source clock (768 kHz)	from BSM main unit
IMP	Respiration impedance signal from the patient	to BSM main unit
JACONT	Control for input	from BSM main unit
PAR-E	External PARA signal	from Input box
PAR-I	Internal PARA signal	to BSM main unit
RCLK	Clock for respiration measurement exciter	to Input box
RW	Respiration waveform	QI transmits the signal only
STS	Input box status signal	from Input box
SYNC	Synchronization signal for input box	from BSM main unit
U1W	Slot 1 head amplifier signal	QI transmits the signal only
U2W	Slot 2 head amplifier signal	QI transmits the signal only
U3W	Slot 3 head amplifier signal	QI transmits the signal only
XADP	QI acknowledgement signal (0V;QI, 5V;head amplifier)	to BSM main unit
XHARST	Head amplifier reset signal (0V; Reset)	from BSM main unit
XRSPOF	Respiration measurement by impedance method is set to OFF when thermistor method is used (0V;Off)	from BSM main unit

5 Circuit Description

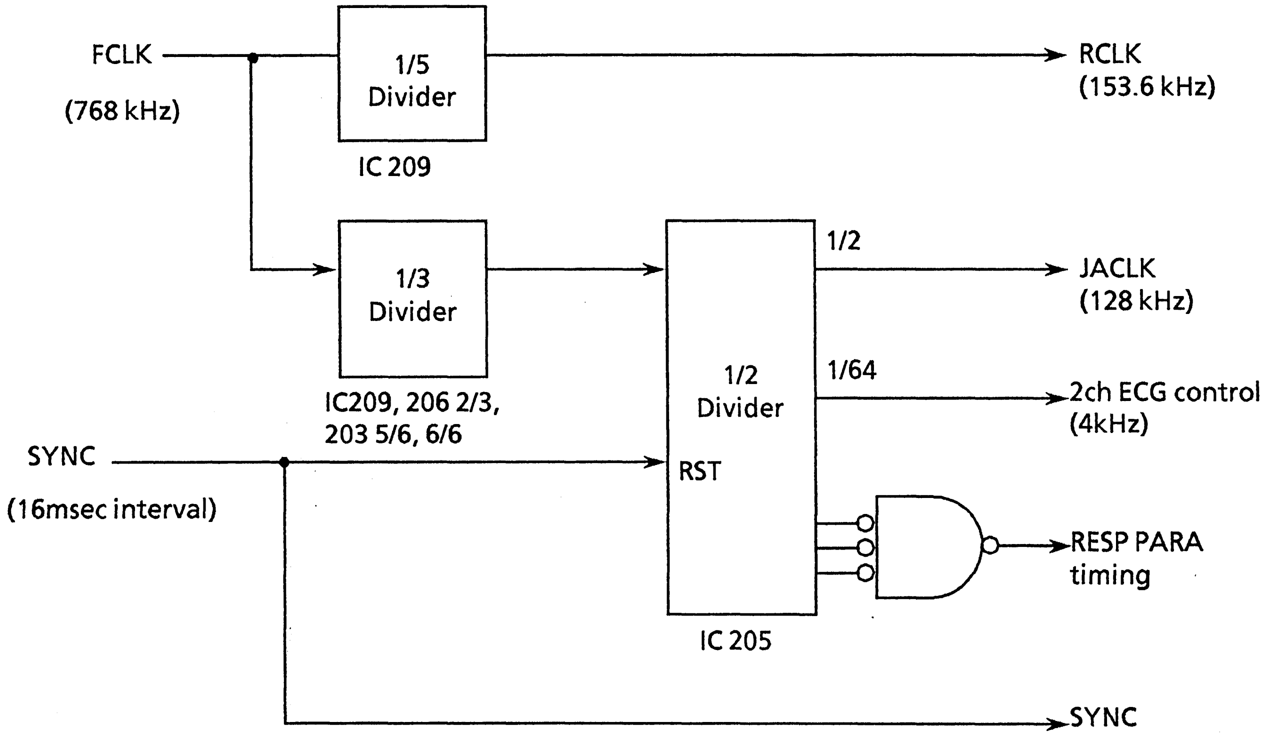
5.1 2ch ECG Time–shared Signal Generator

ECG1 and ECG2 signals are first buffered by IC201 before they are time–shared into 2ch ECG signal by the switch IC207 1/3. The timing control signal enters this switch IC207 1/3 via terminal No.9. IC203 C converts the timing control signal level range from 0V to +5V, to 0V to +8V. The resistor R205 and capacitor C201 filter the switching noise.


8
ECG2
9
ECG1
RA204 100KΩ
RA204 100KΩ
E1
E1
R203 4.99KΩ
R204 4.99KΩ
+8V
-8V
IC201 1/2
IC201 2/2
μPC812
μPC812
4053 IC207 1/3
INH
R205 1KΩ
C201 0.001μF
IC202 1/2
μPC812
2chECG
6
ECG2
ECG1
1/4 RA201 100KΩ
+8V
500μs
8V
0V
500μs
5V
0V
7406
IC203C
Timing Generator Circuit
ECG Head Amp
2CH ECG
ECG Detector
ECG2
ECG1
Input Box
ECG1
ECG2
QI-813P
2CH ECG
BSM-8300
This signal is the same as when the ECG head amp is directly inserted into the slot
ECG Waveform for BSM-8500

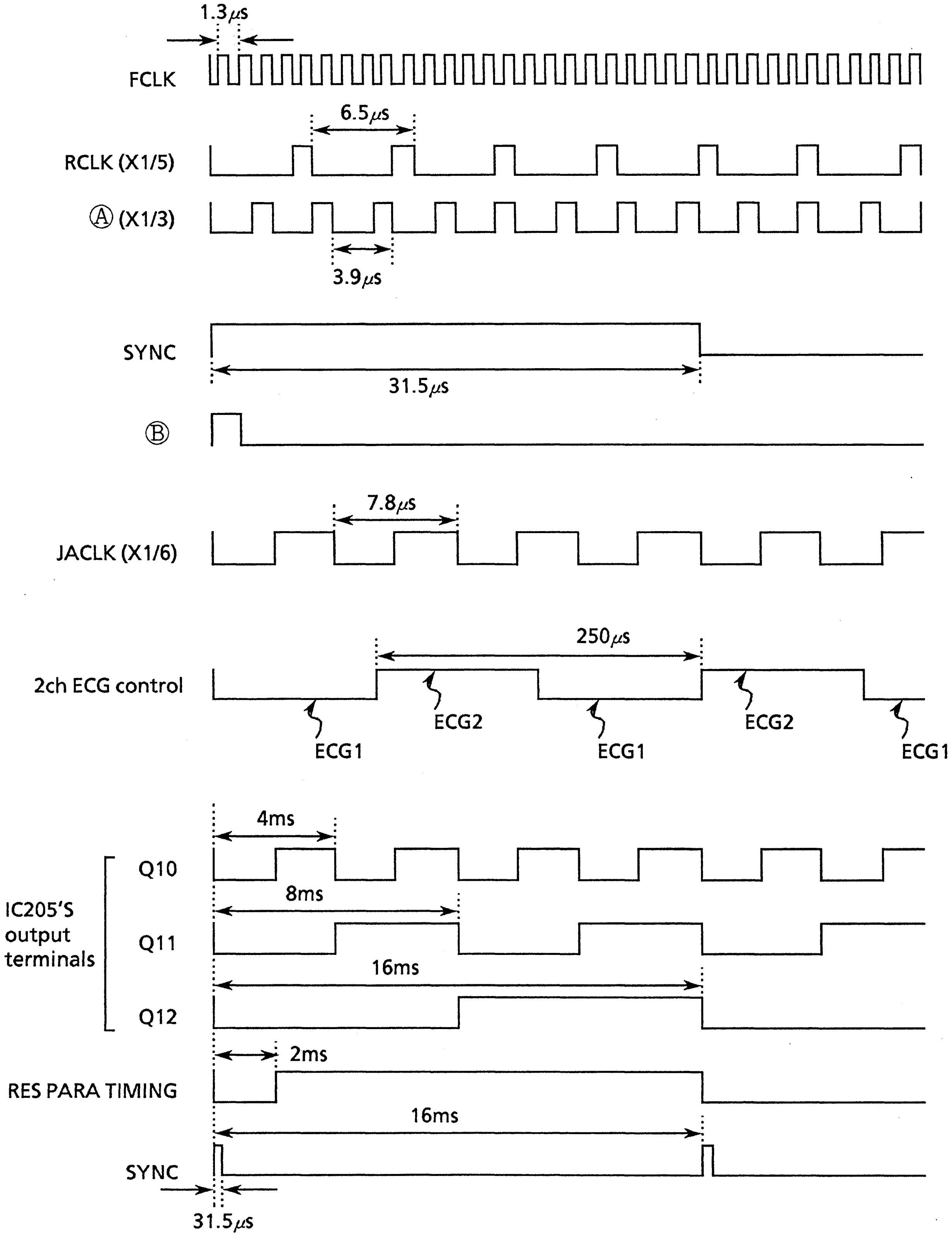
5.2 Timing Generator

FCLK is the source timing clock (768 kHz) signal for this unit. This source timing signal level is shifted by resistor R240, RA 203 4/6, and IC204 1/2. From this clock the following timings are generated:

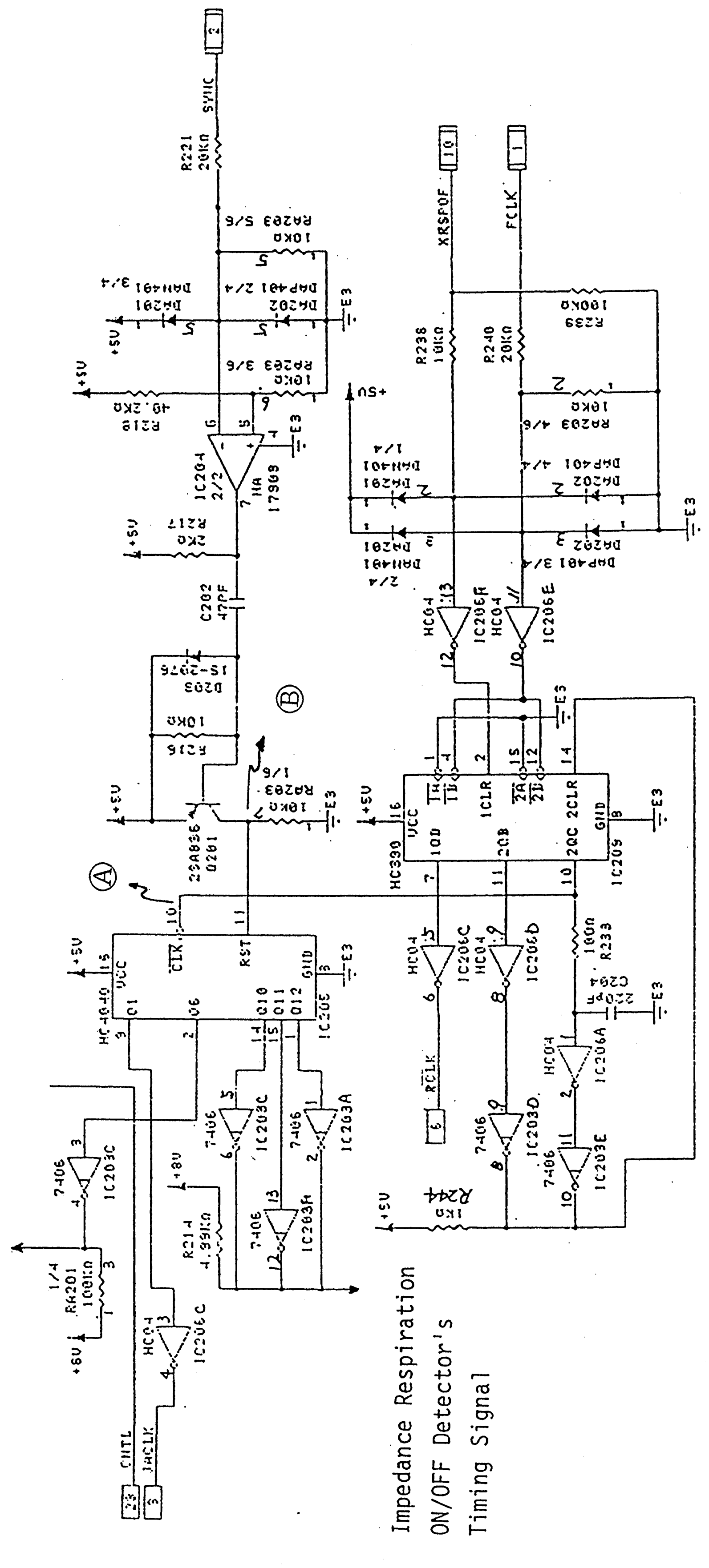

FCLK
(768 kHz)
1/5
Divider
IC 209
RCLK
(153.6 kHz)
1/3
Divider
IC209, 206 2/3,
203 5/6, 6/6
1/2
Divider
RST
IC 205
1/2
JACLK
(128 kHz)
1/64
2ch ECG control
(4kHz)
RESP PARA
timing
SYNC
(16msec interval)
SYNC

This circuit relays the SYNC signal from the bedside monitor to the input box. IC203A, C, and F provide the timing signals to the impedance respiration on/off detection circuit.

Timing Chart


1.3μs
FCLK
6.5μs
RCLK (X1/5)
Ⓐ (X1/3)
3.9μs
SYNC
31.5μs
Ⓑ
7.8μs
JACLK (X1/6)
250μs
2ch ECG control
ECG1
ECG2
ECG1
ECG2
ECG1
4ms
Q10
IC205'S output terminals
8ms
Q11
16ms
Q12
2ms
RES PARA TIMING
16ms
SYNC
31.5μs

Timing Generator Circuit


SYNC
R221 20kΩ
RA203 5/6 10kΩ
DA201 DAN401 3/4
DA202 DAP401 2/4
RA203 3/6 10kΩ
R218 49.2kΩ
IC204 2/2 HA17909
R217 2kΩ
C202 47PF
D203 1S-2076
R216 10kΩ
2SA836 Q201
RA203 1/6 10kΩ
HC4040
IC205
VCC
CLK
RST
GND
Q1
Q6
Q10
Q11
Q12
XRSPOF
FCLK
R238 10kΩ
R240 20kΩ
R239 100kΩ
RA203 4/6 10kΩ
DAN401 1/4
DAP401 4/4
DAN401 2/4
DAP401 3/4
HC04
IC206A
IC206B
IC206C
IC206D
IC206E
HC390
IC209
1CLR
2CLR
1QD
2QB
2QC
R233 100Ω
C204 220pF
RCLK
7406
IC203A
IC203C
IC203D
IC203E
IC203F
R244 1kΩ
R214 4.99kΩ
RA201 100kΩ 1/4
CNTL
JACLK
+5V
+8V
E3
A
B

2 Ch ECG Control Signal

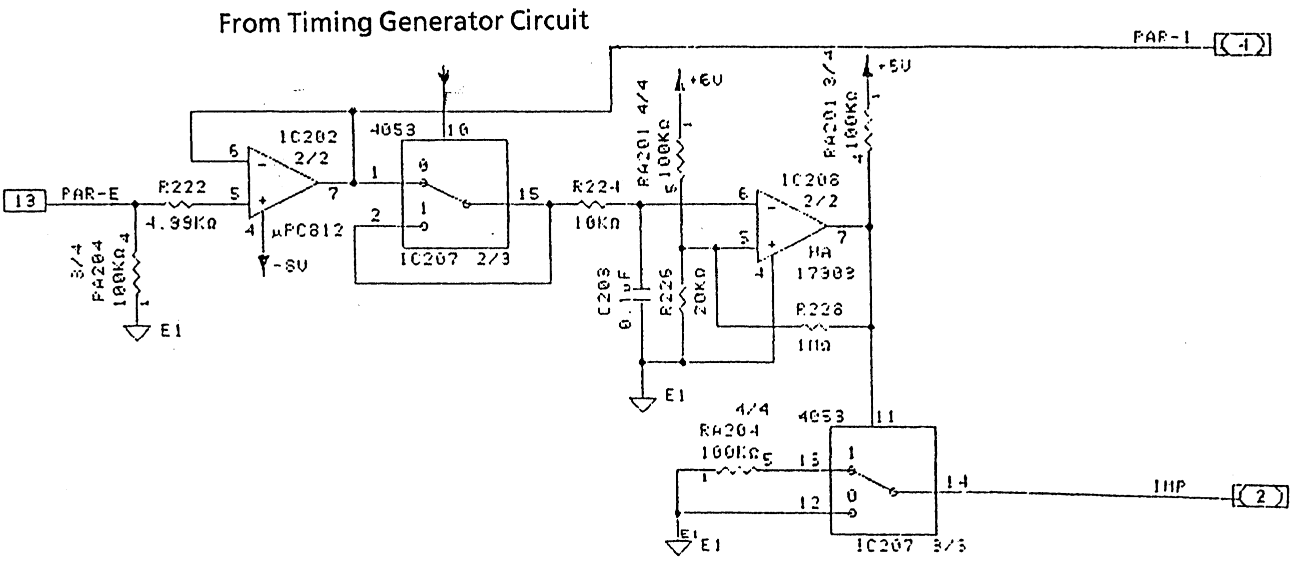
Impedance Respiration
ON/OFF Detector's
Timing Signal

5.3 Impedance Respiration ON/OFF Detector

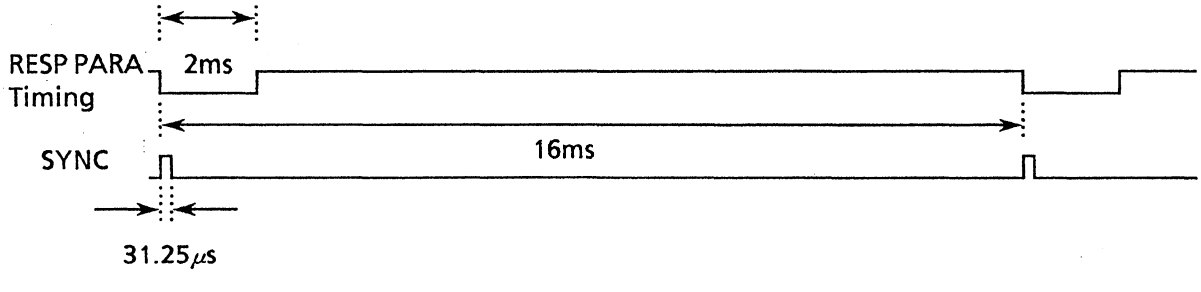
For impedance respiration detector in the input box to function, the impedance between the leads R(RA) and F(LL) has to be less than 2 kΩ. When the impedance is less than 2 kΩ, the para 1 signal from the input box will indicate impedance respiration measurement status on by having a voltage of 0V. When the para 1 signal has a +5V, the impedance respiration measurement is off. This could mean that the impedance in the leads is more than 2 kΩ or the leads are off.

The para 1 signal with 0V will set the switch IC207 3/3 to "1" causing the impedance respiration detector to measure the respiration. A para 1 signal having value +5V sets the switch IC207 3/3 to "0" and thereby shortcircuiting the impedance respiration detector.

The para 1 signal is received by the interface unit as PAR-E. The signal is buffered by IC202 2/2 and transfered to the bedside monitor as signal PAR-I. This unit also pick out the para 1 signal from the PAR-E signal by IC207 2/3 with the timing control signal provided by IC203A, C, and F of the timing generator circuit.

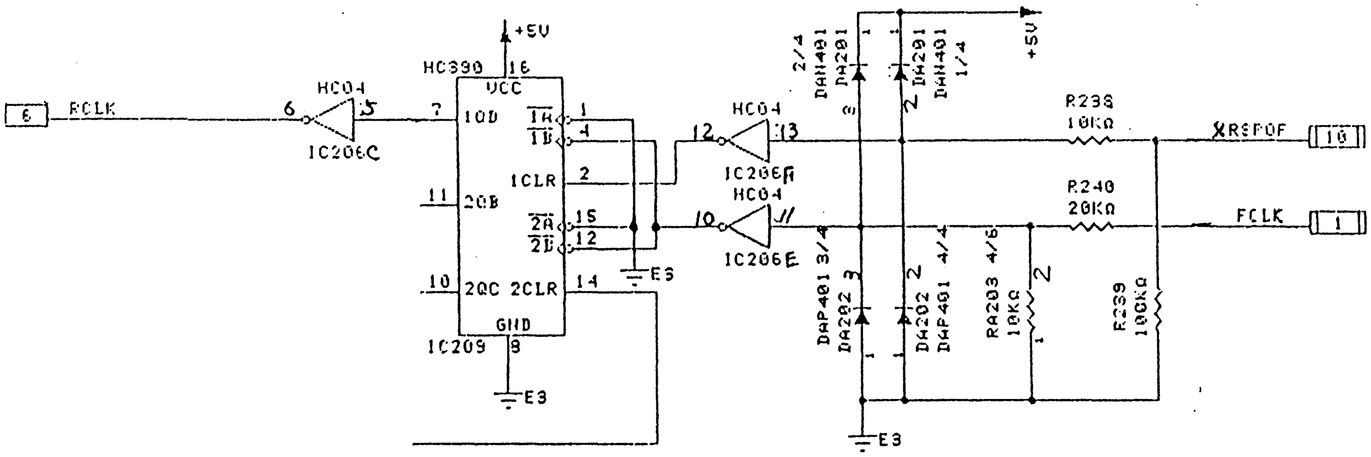

From Timing Generator Circuit
PAR-I
1
+5V
+6V
-5V
13
PAR-E
R222
4.99KΩ
3/4
RA204
100KΩ
E1
IC202
2/2
μPC812
4053
16
0
1
2
15
IC207 2/3
R224
10KΩ
RA201 4/4
100KΩ
C203
0.1μF
R226
20KΩ
RA201 3/4
100KΩ
IC208
2/2
HA
17303
R228
1MΩ
4/4
RA204
100KΩ
4053
11
13
12
14
IC207 3/3
IMP
2

Timing Chart


RESP PARA
Timing
2ms
16ms
SYNC
31.25μs

5.4 Respiration Off

When the respiration is measured using the thermistor method, the bedside monitor sends a signal to the input box instructing it to disable RCLK output to stop measuring the respiration by the impedance method. This signal is known as the XRESPOF.


6
RCLK
HC04
IC206C
+5V
HC390
16
VCC
1QD
1A
1B
1CLR
2QB
2A
2B
2QC 2CLR
GND
IC209
8
E3
HC04
IC206A
HC04
IC206E
DAN401 2/4
DA201
DA201
DAN401 1/4
+5V
DAP401 3/4
DA202
DA202
DAP401 4/4
RA203 4/6
10KΩ
R238
10KΩ
R240
20KΩ
R239
100KΩ
XRESPOF
10
FCLK
1

5.5 Others

The signal XADP of pin 1B of jumper J101 of UP-0613 board is the interface QI-813P acknowledgement signal. This signal informs the BSM-8300 bedside monitor whether the interface QI-813P is connected to it or not.

6 Pin connector Assignment

J201, RDCD-37SE-LNA (To Input Box)

Pin No.	Signal name
1	Not used
2	Not used
3	JACLK
4	Not used
5	Not used
6	RCLK
7	E1
8	ECG2
9	ECG1
10	U2W
11	Not used
12	Not used
13	PAR–E
14	Not used
15	Not used
16	+8V
17	-8V
18	E3
19	+19V
20	Not used
21	SYNC
22	Not used
23	CNTL
24	Not used
25	STS
26	ER
27	RW
28	U1W
29	U3W
30	Not used
31	Not used
32	Not used
33	Not used
34	EH
35	E1
36	E3
37	+19V

UP-0611 ↔ **UP-0613**

J202
FFC-14BSM#02

J105
FFC-14BSM#02

Pin No.	Signal name	Pin No.
1	FCLK	1
2	SYNC	2
3	E3	3
4	E3	4
5	EP	5
6	JACONT	6
7	Not used	7
8	STS	8
9	Not used	9
10	XRESPOF	10
11	+19V	11
12	+19V	12
13	Not used	13

J203
FFC-10BSM#02

J106
FFC-10BSM#02

Pin No.	Signal name	Pin No.
1	RW	1
2	U1W	2
3	E1	3
4	U2W	4
5	+8V	5
6	2 chECG	6
7	–8V	7
8	U3W	8
9	Not used	9

J204
FFC-6BSM#02

J107
FFC-6BSM#02

Pin No.	Signal name	Pin No.
1	EH	1
2	IMP	2
3	ER	3
4	PAR–I	4
5	Not used	5

7 Electrical Part List

UP-0613 JA ADAPTOR MOTHER

ASSY	CKT NO.	PART NO.	QTY		DESCRIPTION
UP-0613	J101-J104	319291	4	PCN	PCN10EA-20P-2.54DSA(0.5u)
UP-0613	J105	091205A	1	PCN	FFC-14BSM1#02ST
UP-0613	J106	091188A	1	PCN	FFC-10BSM1#02ST
UP-0613	J107	091161A	1	PCN	FFC-6BSM1#02ST

UP-0611 JA ADAPTOR IF

ASSY	CKT NO.	PART NO.	QTY		DESCRIPTION
UP-0611	C001-C002	070487	2	TAC	ECSZ35HS6R8B 35V 6.8uF
UP-0611	C003-C009	071236	7	CEC	TPD55Y5V1H104Z5-W 50V 0.1uF
UP-0611	C010	070487	1	TAC	ECSZ35HS6R8B 35V 6.8uF
UP-0611	C011-C015	071236	5	CEC	TPD55Y5V1H104Z5-W 50V 0.1uF
UP-0611	C201	070834	1	FLC	ECQ-B 1H 102JZ3 0.001uF
UP-0611	C202	071281	1	CEC	DD05-989SL470K500 500V 47pF
UP-0611	C203	071094	1	FLC	ECQ-V 1H 104JZ3 (0.1uF)
UP-0611	C204	071325	1	CEC	DD05-989B221K500 500V 220pF
UP-0611	DA201	003613	1	D	DAN401
UP-0611	DA202	003604	1	D	DAP401
UP-0611	D201-D203	071503	3	D	1S2076ATE
UP-0611	D210	071503	1	D	1S2076ATE
UP-0611	IC201	016181	1	OPIC	UPC812C
UP-0611	*IC201	162521	0	OPIC	LF412CN
UP-0611	IC202	016181	1	OPIC	UPC812C
UP-0611	*IC202	162521	0	OPIC	LF412CN
UP-0611	IC203	007832	1	TTL	SN7406N
UP-0611	IC204	010739	1	OPIC	HA17903PS
UP-0611	IC205	018865	1	CMOS	UPD74HC4040C
UP-0611	*IC205	162887	0	CMOS	HD74HC4040P
UP-0611	IC206	018722	1	CMOS	HD74HC04P
UP-0611	*IC206	163574	0	CMOS	UPD74HC04C
UP-0611	IC207	017224	1	CMOS	HD14053BP(MC14053BCP)
UP-0611	*IC207	163289	0	CMOS	MC14053BCP
UP-0611	IC208	010739	1	OPIC	HA17903PS
UP-0611	IC209	019267	1	CMOS	HD74HC390P
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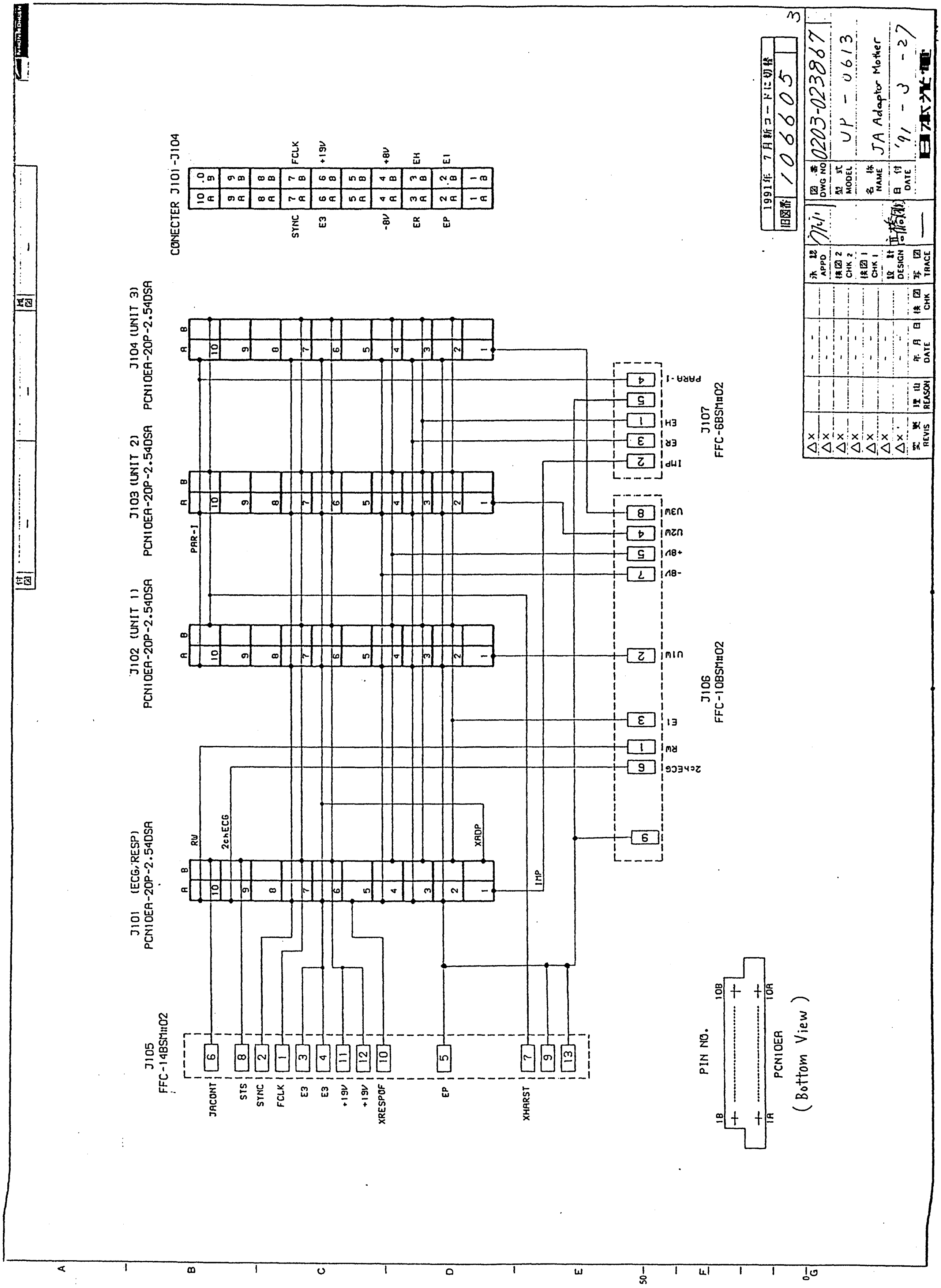
UP-0611	IC210	014673	1	REG	uPC78L05J (NJM78L05A)
UP-0611	*IC210	162423	0	REG	NJM78L05A
UP-0611	J201	081092	1	CN	RDCD-37SE-LNA Receptacle female
UP-0611	J202	091205A	1	PCN	FFC-14BSM1#02ST
UP-0611	J203	091188A	1	PCN	FFC-10BSM1#02ST
UP-0611	J204	091161A	1	PCN	FFC-6BSM1#02ST
UP-0611	Q201	071904	1	TR	2SA836 C or D TZ
UP-0611	RA201	072431	1	RM	EXB-F5 E 104JYV
UP-0611	RA202	318113	1	RM	EXB-F7 E 102J
UP-0611	RA204	072431	1	RM	EXB-F5 E 104JYV

8 Circuit Diagram

8.1 JA ADAPTOR MOTHER (UP-0613)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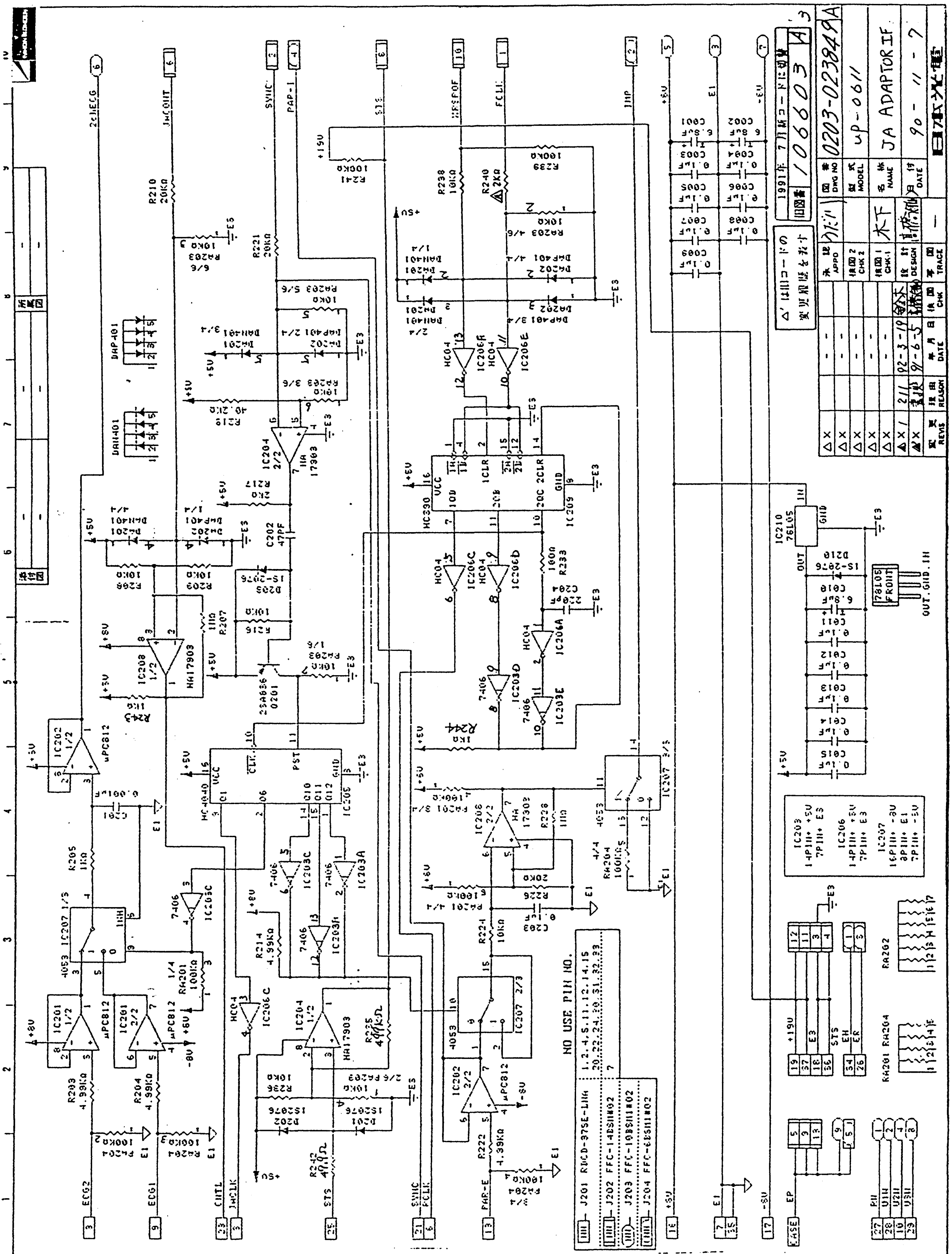
FCLK
E3
+19V
-8V
+8V
ER
EH
EP
EI
J101 (ECG,RESP) PCN10EA-20P-2.54DSA
J102 (UNIT 1) PCN10EA-20P-2.54DSA
J103 (UNIT 2) PCN10EA-20P-2.54DSA
J104 (UNIT 3) PCN10EA-20P-2.54DSA
PAR-I
RW
2chECG
XRDP
IMP
J105 FFC-14BSM#02
JACONT
STS
SYNC
FCLK
E3
E3
+19V
+19V
XRESPOF
EP
XHARST
J106 FFC-10BSM#02
2chECG
RW
EI
U1W
-8V
+8V
U2W
U3W
J107 FFC-6BSM#02
IMP
ER
EH
PARA-I
PIN NO.
1B
10B
1A
10A
PCN10EA
(Bottom View)
1991年 7月新コードに切替
旧図番 106605
3
図番 DWG NO 0203-023867
型式 MODEL UP-0613
名称 NAME JA Adaptor Mother
日付 DATE '91-3-27
APPO
CHK 2
CHK 1
DESIGN
TRACE
REVIS
REASON
DATE
CHK
日本光電
A
B
C
D
E
F
G
50

8.2 JA ADAPTOR IF (UP-0611)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UP-0611
0203-02384A
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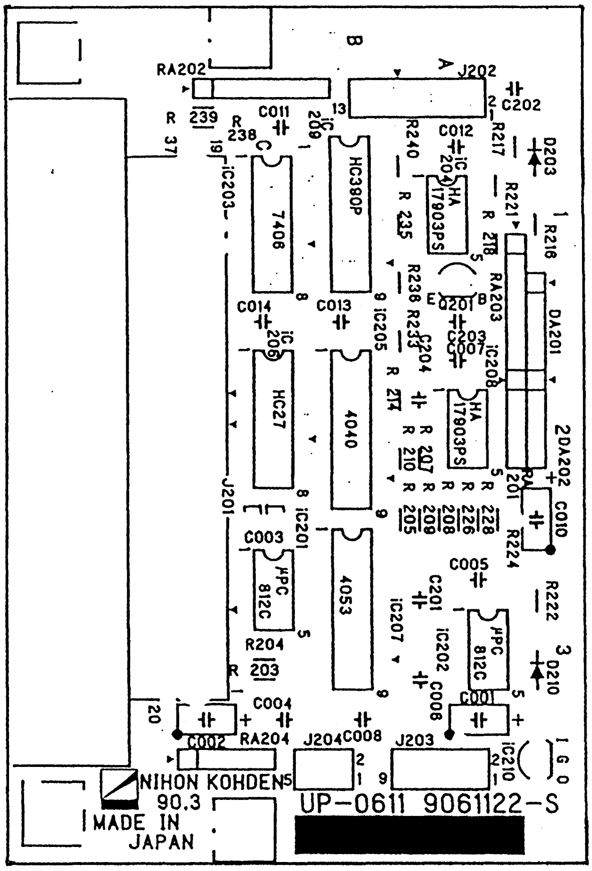
IC201 μPC812
IC202 μPC812
IC203 7406
IC204 HA17903
IC205 HC4040
IC206 HC04
IC207 4053
IC208 HA17903
IC209 HC390
IC210 78L05
DAP401
DAN401
NO USE PIN NO.
J201 RMCD-975E-LHA
J202 FFC-14BSIN02
J203 FFC-19BSIN02
J204 FFC-6BSIN02
ECG2
ECG1
CNTL
JHCLK
STS
SYNC
FCLK
PWR-E
+5V
E1
-5V
EP
CASE
P11
U1H
U2H
U3H
2nECG
JHCOUT
PAP-1
RESPOF
INP
+19V
E3
EH
ER

9 Part Location Guide

JA ADAPTOR IF (UP-0611)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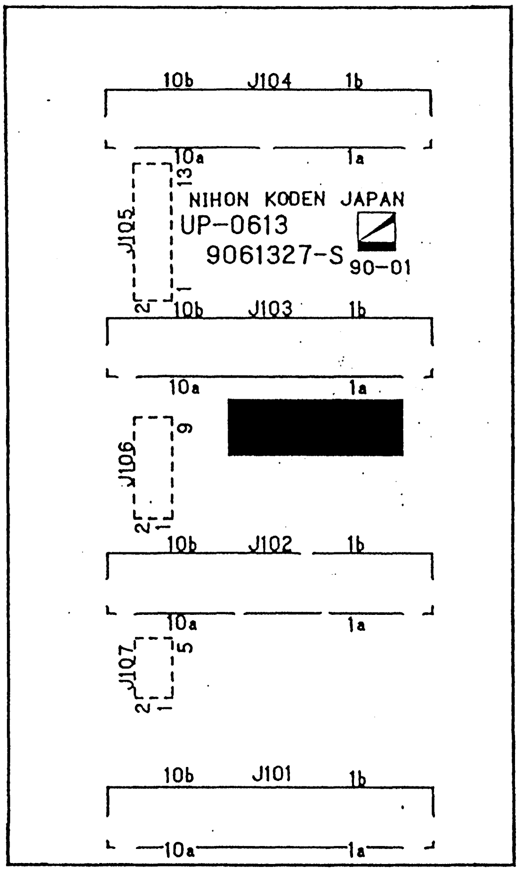
J202
C202
R 239
R 238
C011
C012
R240
R217
D203
iC203
7406
HC390P
iC204
HA17903PS
R 235
R 218
R221
RA203
Q201
DA201
C014
C013
iC205
C203
C204
C007
iC208
iC206
HC27
4040
HA17903PS
R 214
R207
R210
DA202
RA201
C010
J201
iC201
R205
R209
R208
R226
R228
R224
C003
μPC 812C
4053
C005
C201
iC207
iC202
μPC 812C
R222
R204
R 203
D210
C004
C008
C001
C002
RA204
J204
J203
iC210
NIHON KOHDEN
90.3
MADE IN JAPAN
UP-0611 9061122-S

JA ADAPTOR MOTHER (UP-0613)


J104
10b
1b
10a
1a
J105
NIHON KODEN JAPAN
UP-0613
9061327-S
90-01
J103
J106
J102
J107
J101

BSM-8301A
BSM-8301J
BSM-8301K
BSM-8302A
BSM-8302J
BSM-8302K

MU-831RA
MU-831RJ
MU-831RK
MU-832RA
MU-832RJ
MU-832RK
AC-800PA
AC-800PJ
AP-800PA
AW-800PA
AH-800PA
AE-800PA
AR-800PA
AL-800PA
AG-800PA
AG-820PA

Life Scope 9
BEDSIDE MONITOR
BSM-8301/8302

0634-000059

CAUTION

Risk of Fire, Replace Battery as Marked.

Refer to page 9-3 for marked battery.

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Section 1

1. Introduction

1.1 General

Life Scope 9 BSM-8300 series bedside monitors are Nihon Kohden second BSM series monitor following the BSM-8500 series bedside monitors providing 4 head amplifier slots and employing touch-key screen operation panel.

The MU-831RA/J/K main units of each BSM-8301A/J/K provide an ECG/Resp. head amplifier and an NIBP unit while the MU-832RA/J/K main units of each BSM-8302A/J/K have not the NIBP unit.

Head amplifiers for the BSM-8500 series are compatible with the BSM-8300 series except for the AP-851PA NIBP unit.

Difference between the sufixes as as follows:

MU-831/832RA: AC117V line voltage with 6-pin AAMI input of ECG (AC-800PA)
MU-831/832RJ: AC110-125V line with 8-pin input of ECG (AC-800PJ)
MU-831/832RK: AC220-240V line voltage with 8-pin inp of ECG (AC-800PJ)

1.2 System composition and major functions

1) The BSM-8301/8302 compose of each MU-831R/832R main unit and optional head ampifiers.

2) Two optional interfaces QI-812P and QI-814P can be independently installed in the MU main unit.

3) The QI-812P interface is for connecting the WS-841RJ/K or WS-821RJ/K thermal array recorder. This interface is also mounting an interface for RS-232C communiation with an external instrument such as a personal computer.

4) The QI-814P interface is for connectiong the bedside monitor main unit to the central montoring system (OGP-7101/7102 or CNS-8200). This intreface is also mounting an interface for externally inputting OIR-7100 CO2 monitor signal.

5) By using the QI-814P interface, VY-800RA/K display controller can be used for a display monitor.

System composition-1

MU-831RA
MU-831RJ
MU-831RK
Bedside monior
main unit
(with NIBP)

- CD-055P Chassis parts
- CD-056P Chassis parts (speaker, touch panel)
- VM-004P CRT unit
- SC-006R Power supply unit (MU-831RA/J)
  SC-006RK Power supply unit (MU-831RK)
- US-0520A ROM pack with ROM chips
  - UP-0520 ROM pack without ROM chips
- UP-0397 Main board
- UP-0398 CRTC board
- UP-0399 HA (Head Amp) mother board
- UP-0519 Respiration board
- UP-0400 Operation board-1
  - UP-0509 Operation board-2
  - UP-0584 Operation board-3
- AC-800PA (A) ECG head amplifier (MU-831RA)
  AC-800PJ (J/K) ECG head amplifier (MU-831RJ/K)
- AP-712P NIBP unit

- QI-812P Interface (for thermal array recorder, optional)
  - UP-0402 WSIF board
  - YS-015P9 WS connection cable (45cm)
- QI-814P Intreface (for central montor, optional)
  - UP-0401 PIO board

System composition-2

MU-832RA MU-832RJ MU-832RK Bedside monior main unit (without NIBP)	CD-055P		Chassis parts
	CD-056P		Chassis parts (speaker, touch panel)
	VM-004P		CRT unit
	SC-006R SC-006RK		Power supply unit (MU-832RA/J) Power supply unit (Mu-832RK)
	US-0520A		ROM pack with ROM chips
		UP-0520	ROM pack without ROM chips
	UP-0397		Main board
	UP-0398		CRTC board
	UP-0399		HA (Head Amp) mother board
	UP-0519		Respiration board
	UP-0400		Operation board-1
		UP-0509	Operation board-2
		UP-0584	Operation board-3
	AC-800PA AC-800PJ		ECG head amplifier (MU-832RA) ECG head amplifier (MU-832RJ/K)
	QI-812P		Interface (for thermal array recorder, optional)
		UP-0402	WSIF board
		YS-015P9	WS connection cable (45cm)
	QI-814P		Interface (for central monitor, optional)
		UP-0401	PIO board

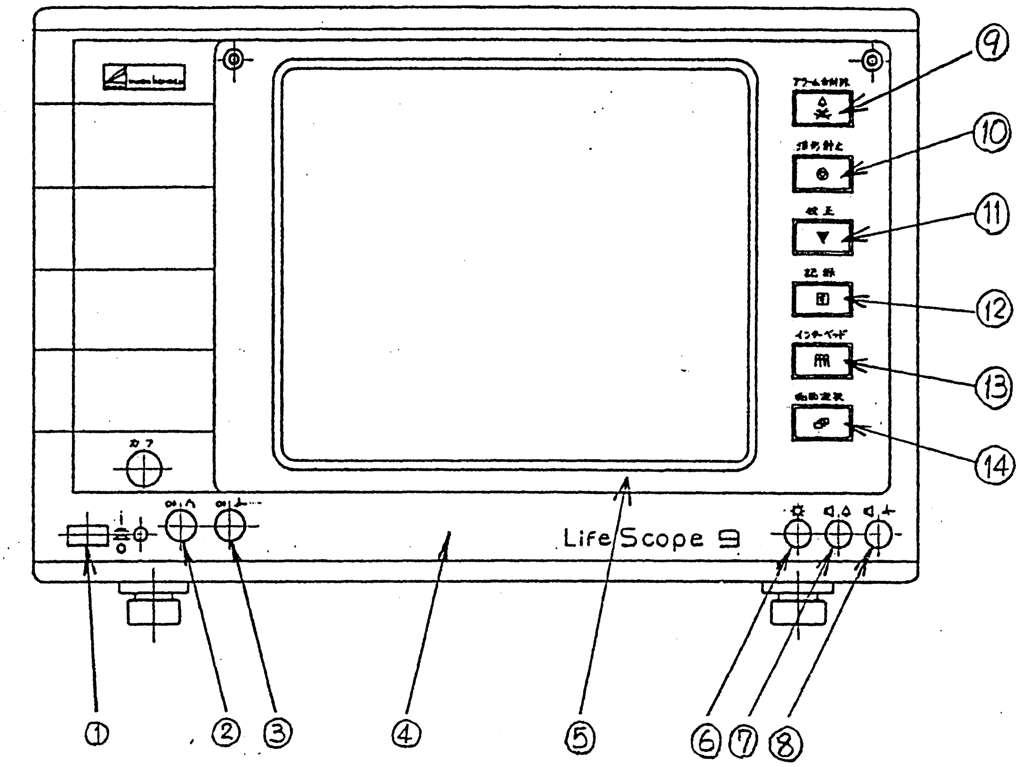
1.3 Panel descriptions

1.3.1 Front

1. Power switch
2. BP1 output connector
3. ECG1 output connector
4. Front frame
5. Touch-key panel assembly

6. Brightness control volume
7. Alarm tone control volume
8. QRS sync. tone control volume
9. Alarm tone SUSPEND key
10. Waveform FREEZE key

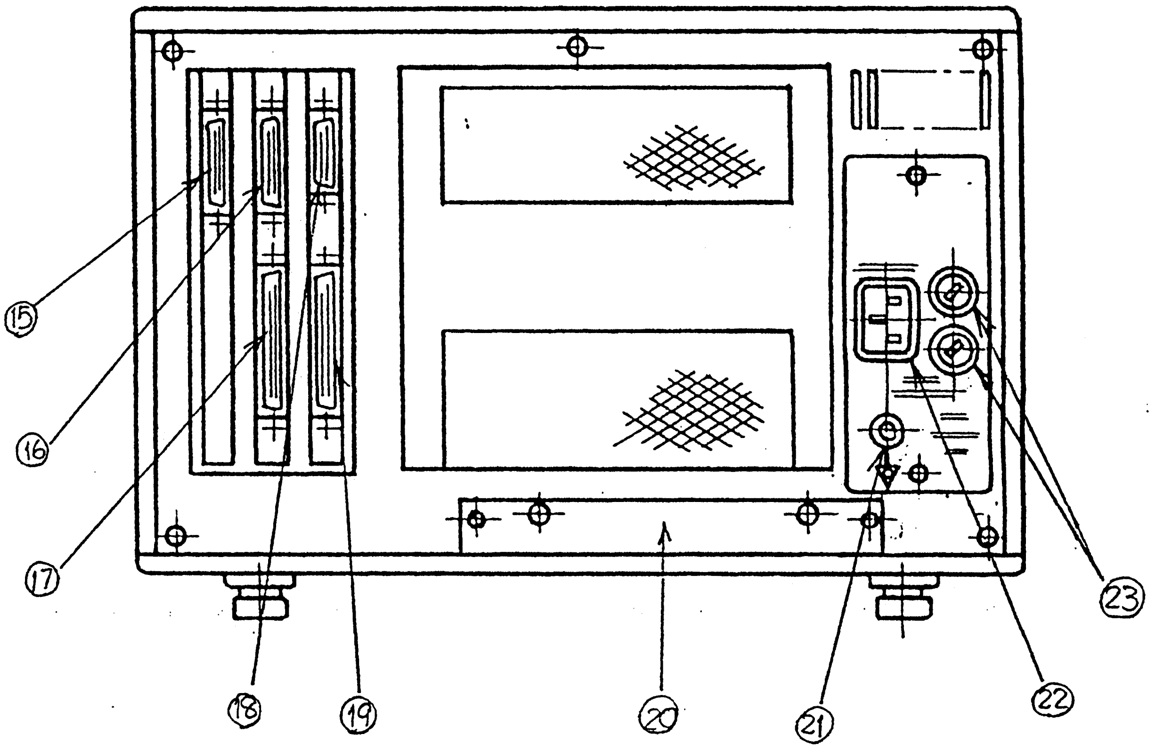
11. TEST key
12. RECORD key
13. INTERBED key
14. DISPLAY selection key



1.3.2 Rear

15. VIDEO output connector
16. RS-232C connector (optional)
17. WS connector (optional)
18. AUX input connector
19. CNS connector (optional)
20. ROM pack

21. Equipotential terminal
22. AC SOURCE socket
23. Fuse holder

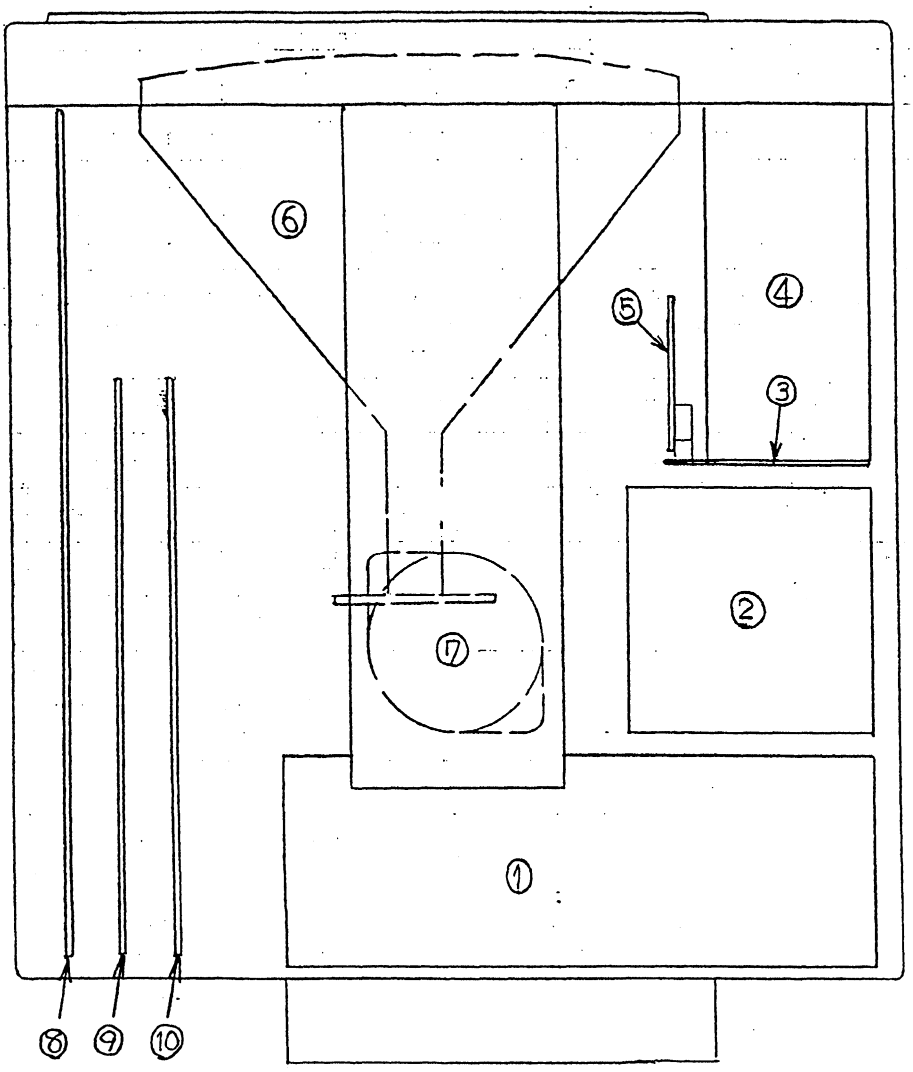


1.4 Location of components

1.4.1 Top view

1. SC-006R, SC-006RK power unit
2. AP-712P NIBP unit
3. UP-0399 Head amplifier mother board
4. Head amplifier compartment
5. UP-0519 Respiration board

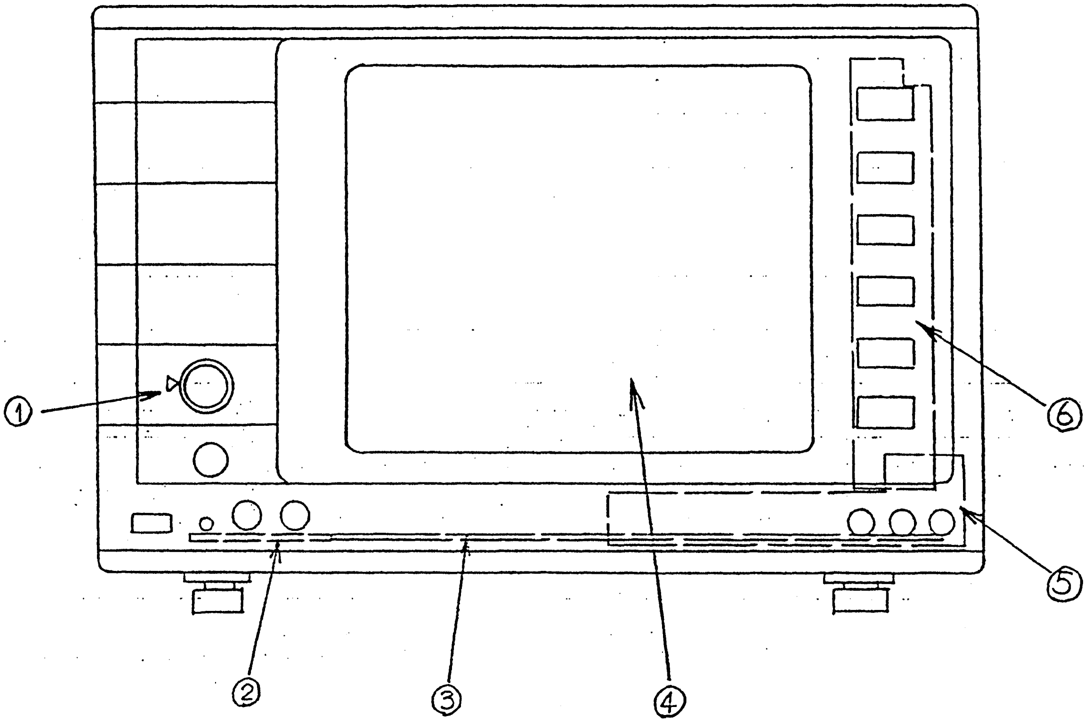
6. VM-004P CRT unit
7. Speaker
8. UP-0398 CRTC board
9. UP-0402 WSIF board (QI-812P)
10. UP-0401 PIO board (QI-814P)



1.4.2 Front view

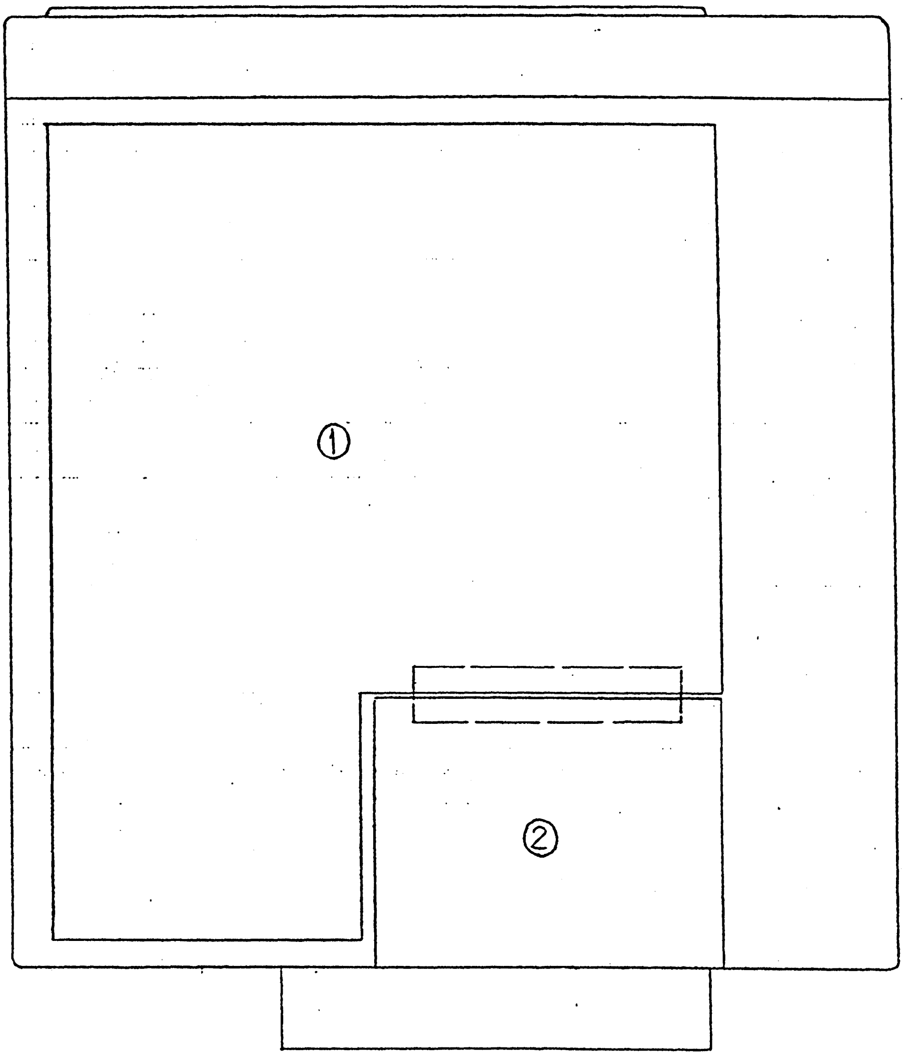
1. AC-800PA, 800PJ ECG/RESP head amplifier
2. UP-0584 Operation board-3
3. UP-0397 Main board
4. Touck-key panel
5. UP-0400 Operation board-1

6. UP-0509 Operation board-2



1.4.3 Bottom view

1. UP-0397 Main board
2. US-0520A ROM pack



1.5 Servicing policy

Maintenance of the unit by users is cleaning the touch-key panel touch-key panel sensing part assignment. Replacing components must be done by qualified thechnical personnel only.

As repair of the four layer printed pattern boards of the high part counting density and surface bonding parts are requires special toos and high skill, do not try to reair then in field. Repair should be done in service house.

All NIBP units must be returned to Nihon Kohden for repair as it requires special adjustment for accuracy and safety.

Be sure the following point before servicing.

1) Ask users for details of trouble before and after toruble occurence.

2) Check trouble from various view points before opening the unit.

3) Use the self test program of the main unit to focus the trouble source.

1.6 Precautions when servicing

1) High voltage hazard exists around the CRT unit. Be careful not to touch inside the unit.

2) When transfering printed circuit boards, put them in conductive bag to protect against damage due to high static electricity. Never use styloleform or polyethilen bag.

3) Electrical parts on the MAIN board and CRTC board are of surface bonding and require special tools to remove and resolder. Be sure poor handling of such parts will break the printed patterns on or inside the boards.

Section 2

2. Troubleshooting and self test mode program

2.1 Troubleshooting

1) Screen trouble

Phenomenon	Check point and trouble source	Action
Blank screen (entire black)	Power lamp lighting? .Power source down. .Faulty power unit. .Shortened +5V (check +5V by pulling out each board one by one.	Check AC line voltage, fuses. Check power unit without load and replace power unit if still faulty. Replace power unit. Replace faulty board.
	Loose ROM pack on the rear.	Secure ROM pack.
	Loose connetors (external, internal)	Secure connectors.
	CRT heater OK? .Faulty power unit.	Check power unit without load and replace power unit if still faulty.
	.Shortened +12V 1) Disconnect CRT unit cable.	1) Check +12V and replace CRT unit if +12V is OK.
	2) Disconnect NIBP unit.	2) Check +12V and replace NIBP unit if +12V is OK.
	3) Disconnect CRTC board.	3) Check +12V and replace CRTC board if +12V is OK.
	Check QRS sync. tone, central communication, etc.	Replace CRTC board.
	Entire malfunction?	Replace main board.

Phenomenon	Check point and trouble source	Action
Faulty display (including entire white screen)	Faulty horizontal and/or vertical synchronization.	
	.Poor adjustment of CRT unit.	Adjust H-HOLD and/or V-HOLD volume on CRT unit.
	.Faulty CRTC board.	Replace CRTC board.
	Poor characters and/or waveforms.	
	.Faulty ROM pack (check by Self Test for ROM test).	Replace ROM pack.
	.Poor characters and/or waveform on screen.	Replace CRTC baord.
Dimmed screen.	Dirty back of touch-key panel or CRT surface.	Remove touch-key panel and clean touch-key panel and CRT surface.
	Poor CRTC board adjustment.	Adjust SUB-BRIGHT volume on CRTC board.
	Poor CRT unit adjustment.	Adjust SUB-BRIGHT volume on CRT unit. Replace CRTC board and/or CRT unit if not adjustable.

2) Waveform trouble

Phenomenon	Check point and trouble source	Action
No waveform (including no trace for waveform)	All traces are faulty (no trace or waveform)	
	.CRTC board faulty.	Replace CRTC board.
	No waveform except for ECG?	
	.Head amplifier faulty.	Replace head amplifier.
	.Resp. board faulty (if only respiration trace is faulty).	Replace Resp. board.
	.CRTC board faulty (no trace at Self Test).	Replace CRTC board.

Phenomenon	Check point and trouble source	Action
No waveform (flat trace)	All traces are flat including calibration waveform. .Power unit faulty.	Replace power unit if power unit is faulty without load.
	1) Disconnect interface board.	1) Replace interface board if power is OK without interface board.
	2) Disconnect NIBP unit.	2) Replace NIBP unit if power is OK without NIBP unit.
	3) Remove head amplifiers one by one.	3) Replace faulty head amplifier(s).
	4) Main board faulty.	4) Replace main board.
	All traces are flat but calibration waveform is OK. 1) Head amplifier faulty.	1) Replace faluty head ampl.
	2) Main board faulty.	2) Replace main board.

3) Sound trouble

Phenomenon	Check point and trouble source	Action
No sound generation.	No key click tone? .Speaker faulty. .CRTC board faulty. .Main board faulty.	.Replace speaker. .Replace CRTC board. .Replace main board.
	No alarm tone or QRS sync. tone? .Main board faulty.	.Replace main board.
Incorrect tone.	All tones incorrect? .CRTC board faulty. .Main board faulty.	.Replace CRTC board. .Replace main board.
	Alarm tone or QRS sync. tone incorrect? .Main board faulty.	.Replace main board.
	Continuous tone generation. .Main board faulty.	.Replace main board.

4) Touch key trouble

Phenomenon	Check point and trouble source	Action
No operation of touch key.	Indication of touch key position at self test key OK? .Poor adjustment of touch key positioning. .Touch key faulty (cracking) 1) Material also broken? 2) Smooth moving at position setting? TOUCH KEY A/D value at self test A/D, D/A test OK? (000 when not pushed) (800±600 when pushed)	.Readjust the touch key positioning. .Replace the touch key panel if material is broken. .Readjust touch key positioning if crack is small. .Replace the touch key panel if 000 is not displayed when it is removed, or replace the main board if 000 is displayed. .If trouble is found when touch key is pressed, replace the main board.

5) NIBP trouble

Phenomenon	Check point and trouble source	Action
NIBP operation (No NIBP indication on the screen).	Check connection cable connecting the NIBP unit.	Secure connection cable. Replace NIBP unit.
No cuff inflation. No cuff pressure indication. No measurement.	NIBP unit faulty.	Replace NIBP unit.
Error is indicated.	Cuff bending, clamping. Air leakage from cuff hose.	Check cuff hose or replace.
Measurement results seem to be faulty.	Measure blood pressure with the monitor and stesoscope simultaneously and compare the results.	Check cuff wrapping. Replace NIBP unit.

2.2 Self Test

Self test is to inspect normal functions of the instrument and to find trouble source when servicing. Self test contains a lot of of information but is not perfect.

There are two self test modes.

1) Power on self test
2) Off line (manual) self test

2.2.1 Power on self test

Power-on self test is done when power is turned on. If trouble is found and system cannot operate any more, screen changes to the off-line self test mode and error is displayed on the screen. If trouble small for normal operation (ex. backed up data are broken or backup battery has discharged), screen proceeds to the normal operation mode. Contents of such error can be reviewed on the off-line self test mode screen.

Power-on self test covers memory and I/O devices on the main board and CRTC board. If optional interface board(s) are mounted, devices on the board(s) are covered.

1) Main board test (UP-0397)

. RAM test (IC128-IC135)

Data "55H" is written into eight pieces of 256k S-RAM chips and read out to be compared with the original data. RAM data are not broken with this test.

. ROM test (IC122-IC127)

Sum value of each five pieces of ROM chips is compared with previously stored sum value in ROM to be compared with.

. Clock test (IC140)

Clock IC data are read and legality of time and date is inspected.

. Serial IO test (IC137)

Data of status register are read out and TxRDY and TxE signals are inspected.

. Interrupt test (IC104)

Intervals of 2mS interrupt and real-time clock interrupt are inspected.

- EEPROM test (IC141)

  Sum value is compared with previously stored sum value in EEPROM.

- A/D, D/A test

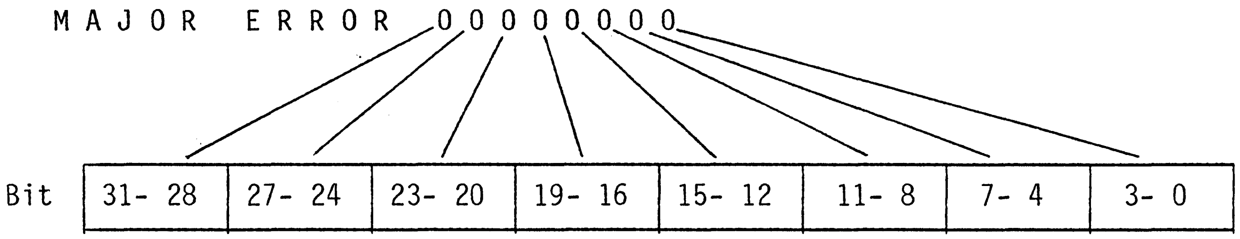
  D/A converter output is A/D converted to inspect whether the A/D output in the specified normal range.

- Battery test

  Battery voltage for clock IC is A/D converted and inspected whether it is in the specified normal range.

Error code at power-on test

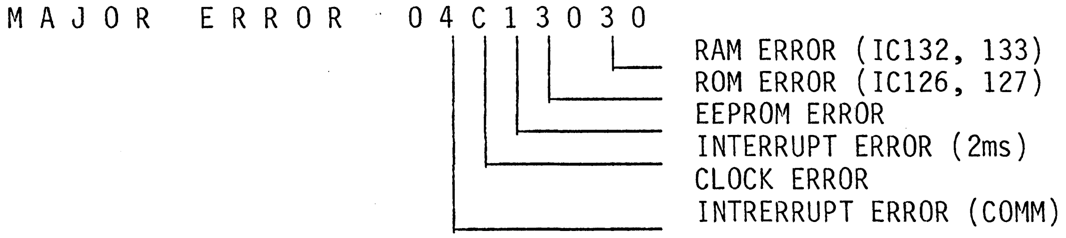
Error code is indicated with one hexadecimal code for each four bits. Therefore, eight digits can display 32 kinds of error.

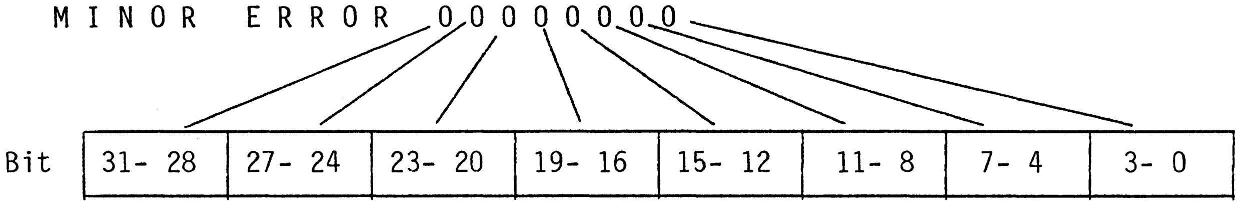


Bit	Description
31	Undefined '0"
30	Undefined '0"
29	Undefined '0"
28	Undefined '0"
27	Interrupt error (BUS ERROR)
26	Interrupt error (COMM. ERROR)
25	Interrupt error (DMA ERROR)
24	Interrupt error (CLOCK ERROR)
23	Interrupt error (2mS ERROR)
22	Clock error
21	Undefiend "0"
20	Undefiend "0"
19	Undefiend "0"
18	Baud rate clock error (QI-812P)
17	Undifiend "0"
16	EEPROM error (IC141)

15	ROM error (IC127)
14	ROM error (IC127)
13	ROM error (IC127)
12	ROM error (IC126)
11	ROM error (IC125)
10	ROM error (IC124)
9	ROM error (IC123)
8	ROM error (IC122)
7	RAM error (IC135)
6	RAM error (IC134)
5	RAM error (IC133)
4	RAM error (IC132)
3	RAM error (IC131)
2	RAM error (IC130)
1	RAM error (IC129)
0	RAM error (IC128)

Example of major error indication


MAJOR ERROR 04C13030
RAM ERROR (IC132, 133)
ROM ERROR (IC126, 127)
EEPROM ERROR
INTERRUPT ERROR (2ms)
CLOCK ERROR
INTRERRUPT ERROR (COMM)


MINOR ERROR 00000000
Bit
31- 28
27- 24
23- 20
19- 16
15- 12
11- 8
7- 4
3- 0

Bit	Description
31	Undifined "0"
30	Undifined "0"
29	Undifined "0"
28	Undifined "0"
27	Undifined "0"
26	Undifined "0"
25	Undifined "0"
24	Undifined "0"
23	Undifined "0"
22	Undifined "0"
21	Undifined "0"
20	Undifined "0"

19	Undifined "0"
18	Undifined "0"
17	Undifined "0"
16	Undifined "0"
15	Undifined "0"
14	Undifined "0"
13	Serial I/O error (QI-812P)
12	A/D converter error (QI-814P)
11	Communication controller error (QI-814P)
10	Wave RAM error (IC210)
9	Wave RAM error (IC209)
8	Wave RAM error (IC208)
7	Wave RAM error (IC207)
6	Graphic RAM error
5	Undifined "0"
4	ACRTC error (CRTC)
3	A/D converter error (MAIN)
2	Battery discharged
1	A/D converter error
0	A/D, D/A loop error

2) CRTC board test (UP-0398)

- CRT controller test (IC109)

  Data of control register are read out to be compared with preset values. Also status register is inspected as the same manner.

- Graphic RAM test (IC112-IC119)

  Test pattern "5555H" is written into RAM for chatacter/graphic display (frame buffer memory) and read out to be compared with the original data. Then "0000H" is read out to inspect whether all addresses are "0000H".

- Wave RAM test (IC207-IC210)

  Test pattern "5555H" and "0000H" are written and read out for Write/Read test.

3) QI-812P (UP-0402 WSIF baord) test

- Serial I/O test (IC201)

  Data of status register are read out and TxRDY and TxE signals are inspected.

- Baud rate clock test (IC203)

  Software timer counts baud rate clock and inspects whether frequency is in specified normal range.

4) QI-814P (UP-0401 CNS PIO board) test

- Communication controller test (IC111)

  Data of status register are read out and TxE signal is inspected.

- A/D converter test

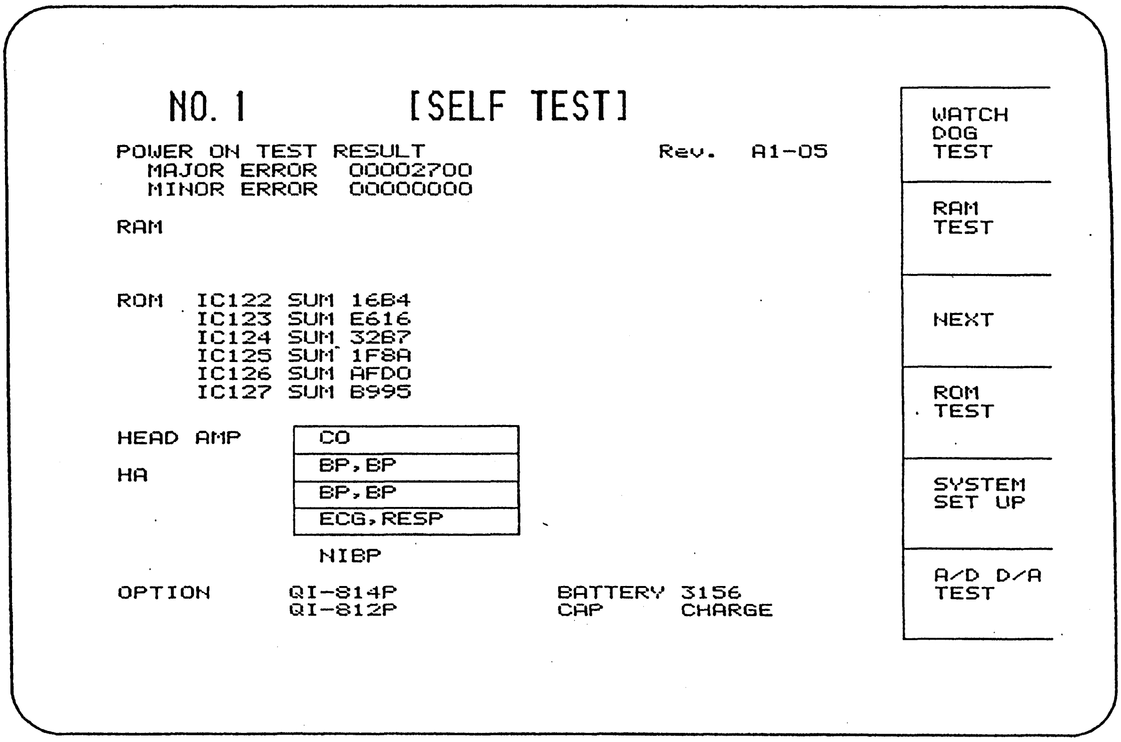
  A/D converter starts and end of conversion (EOC) signal is inspected whether it is outputted within specified normal time.

2.2.2 Off-line (manual) self test

Off-line (manual) self test mode is called up by turning power on while pressing the TEST key. System setup is done in the off-line self test. Test mode screens consists of No.1 screen through No.8 screen. Each time the TEST key is pressed, screen proceeds up. DISPLAY key calls up sub screen if exists.

1) Self test title screen (No.1)

Following items are displayed when the self test No.1 screen is called up.



```
    NO. 1          [SELF TEST]

POWER ON TEST RESULT                 Rev.   A1-05
  MAJOR ERROR   00002700
  MINOR ERROR   00000000

RAM


ROM    IC122 SUM 16B4
       IC123 SUM E616
       IC124 SUM 32B7
       IC125 SUM 1F8A
       IC126 SUM AFD0
       IC127 SUM B995

HEAD AMP        CO
HA              BP,BP
                BP,BP
                ECG,RESP
                NIBP

OPTION          QI-814P          BATTERY 3156
                QI-812P          CAP     CHARGE
```

- Power-on test result display

  Major and minor errors are separately displayed. Error code is eight digits of hexadecimal number and each digit is hexadecimal number of four bits. If there is no error, all digits read "0".

- Program revision number display

  Displayes mounted program revision number. Revision number determines specifications and functions of the bedside monitor. Be careful of the number.

- Head amplifier insertion detection display

  When the head amplifiers are inserted into the main unit, parameter names of the units with "HA" (Head Amplifier) are displayed. If the extension input box is used, "JA" is displayed instead of "HA". For ECG/Respiration head amplifier, "ECG, RESP" is displayed when the amplifier is in measuring condition. "NIBP" is is displayed when the NIBP unit in mounted correctly.

- Optional board insertion detection display

  When the optional interface boards (QI-812P and QI-814P) are inserted, interface models are displayed.

- Battery voltage, backup capacitor voltage display

  Battery voltage for clock IC is tested. If higher than 2.6 volts (indication is "2600" for 2.6 volts) it is normal.

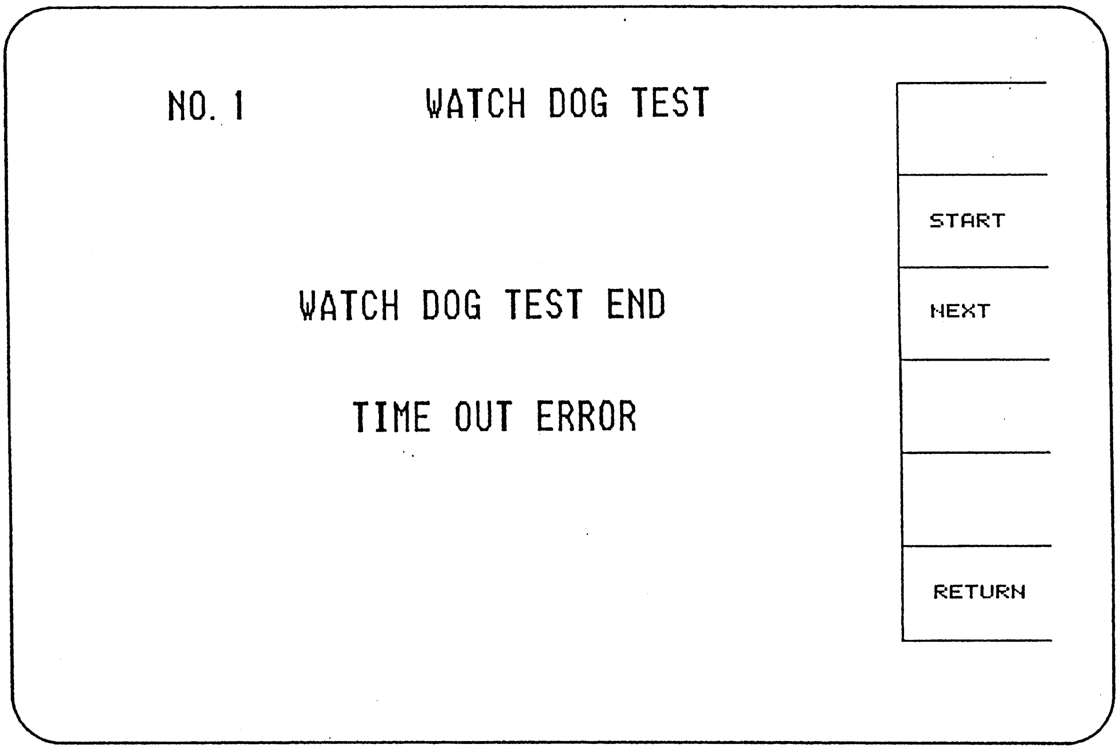
  Backup capacitor is for data backup against short power failure. Voltage is measured only once at power on as it is immediately charged after power on. Therefore, when self test No.1 screen is called up from No.8 screen using the TEST key, there is no backup capacitor test information. CHARGE or DISCHARGED is displayed according to capacitor voltage at power on.

Following tests are performed by key operation

- Watch dog timer test

By pressing the SUSPEND key watch dog timer test screen is called up and test starts. Message "WATCH DOG TEST RUNNING" is displayed while testing. Test results indication is "NO ERROR" or "TIME OUT ERROR".

Pressing the DISPLAY key returns the screen to No.1 screen.
Pressing the FREEZE key restarts the watch dog timer test.
Pressing the TEST key advance the screen to No.2 screen.



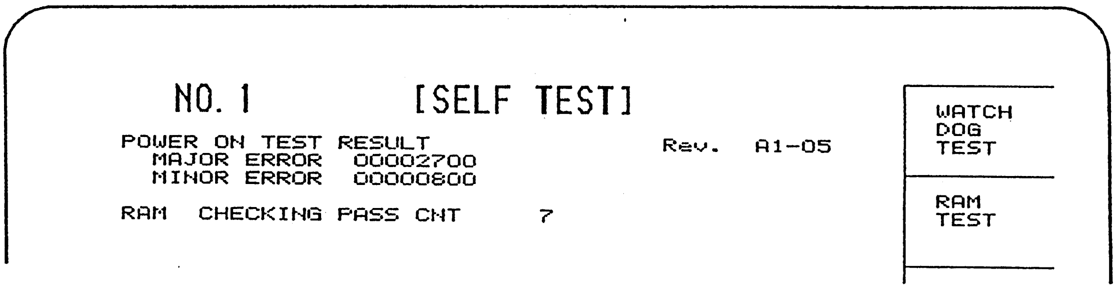
```
NO. 1          WATCH DOG TEST

        WATCH DOG TEST END

          TIME OUT ERROR
```

. RAM test

RAM test starts by pressing the FREEZE key at the No.1 screen. Test is made by Write/Read method. Message :CHECKING PASS CNT XX (XX is numerics) while checking.

If an error is found, the IC number, address and read data/write data are dispalyed.

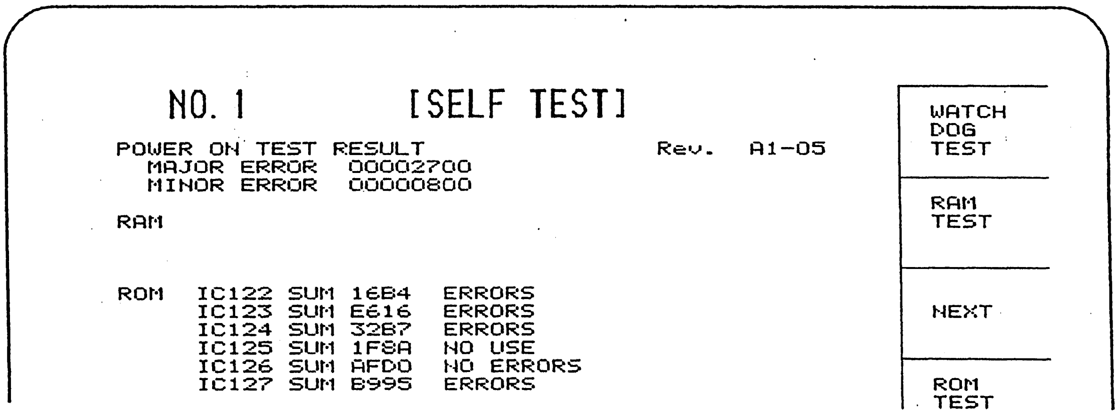
TEST key must be used to escape from this RAM test to the No.2 screen.



```
NO. 1          [SELF TEST]
POWER ON TEST RESULT                    Rev.   A1-05
  MAJOR ERROR  00002700
  MINOR ERROR  00000800

RAM   CHECKING PASS CNT      7
```

. ROM test

ROM test starts by pressing the RECORD key. Message "CHECKING" is displayed while checking.

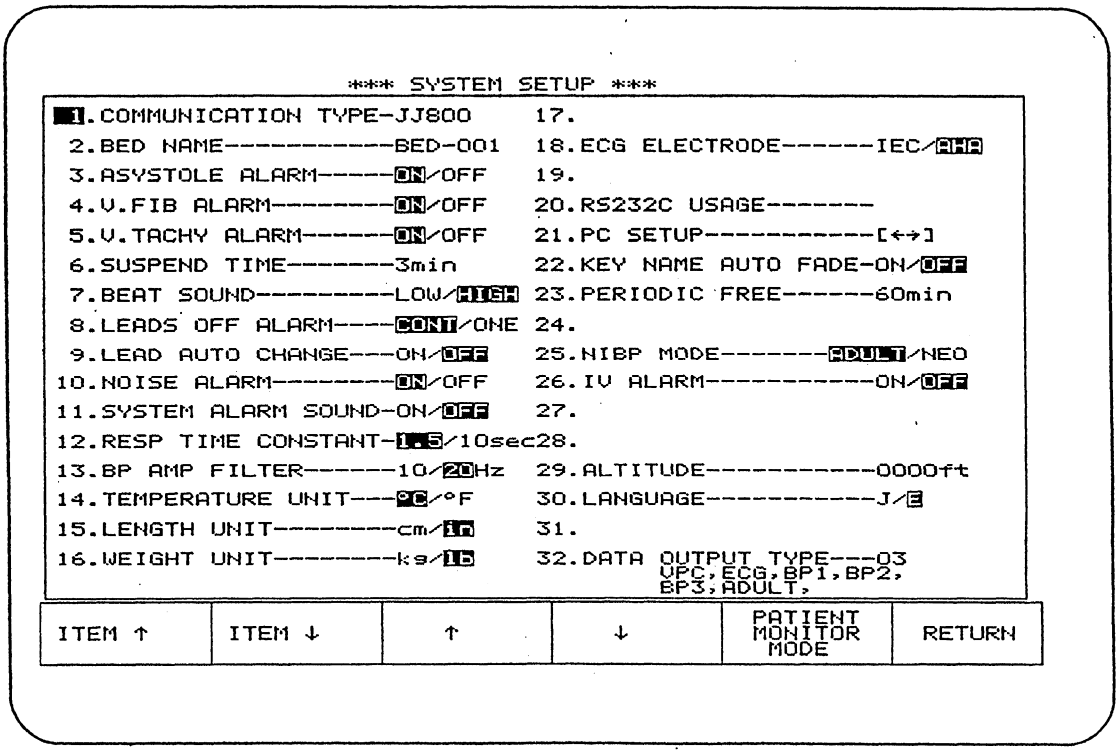


```
NO. 1          [SELF TEST]

POWER ON TEST RESULT                  Rev.   A1-05
  MAJOR ERROR  00002700
  MINOR ERROR  00000800

RAM


ROM    IC122 SUM 16B4   ERRORS
       IC123 SUM E616   ERRORS
       IC124 SUM 32B7   ERRORS
       IC125 SUM 1F8A   NO USE
       IC126 SUM AFD0   NO ERRORS
       IC127 SUM B995   ERRORS
```

. System setup

System setup screen is called up by pressing the INTERBED key. System setup menu includes various items such as physical units, language, etc. ITEM , ITEM and keys of the touch-key panel are used to select items. After setting LANGUAGE "E" (ENGLISH), press the SUSPEND key for three scocnds to initialize the system.

Initialization means the factory set including trend data except for clock set and touch-key positioning. Press the "PATIENT MONITOR MODE" key or RETURN key to return the screen to No.1 screen.

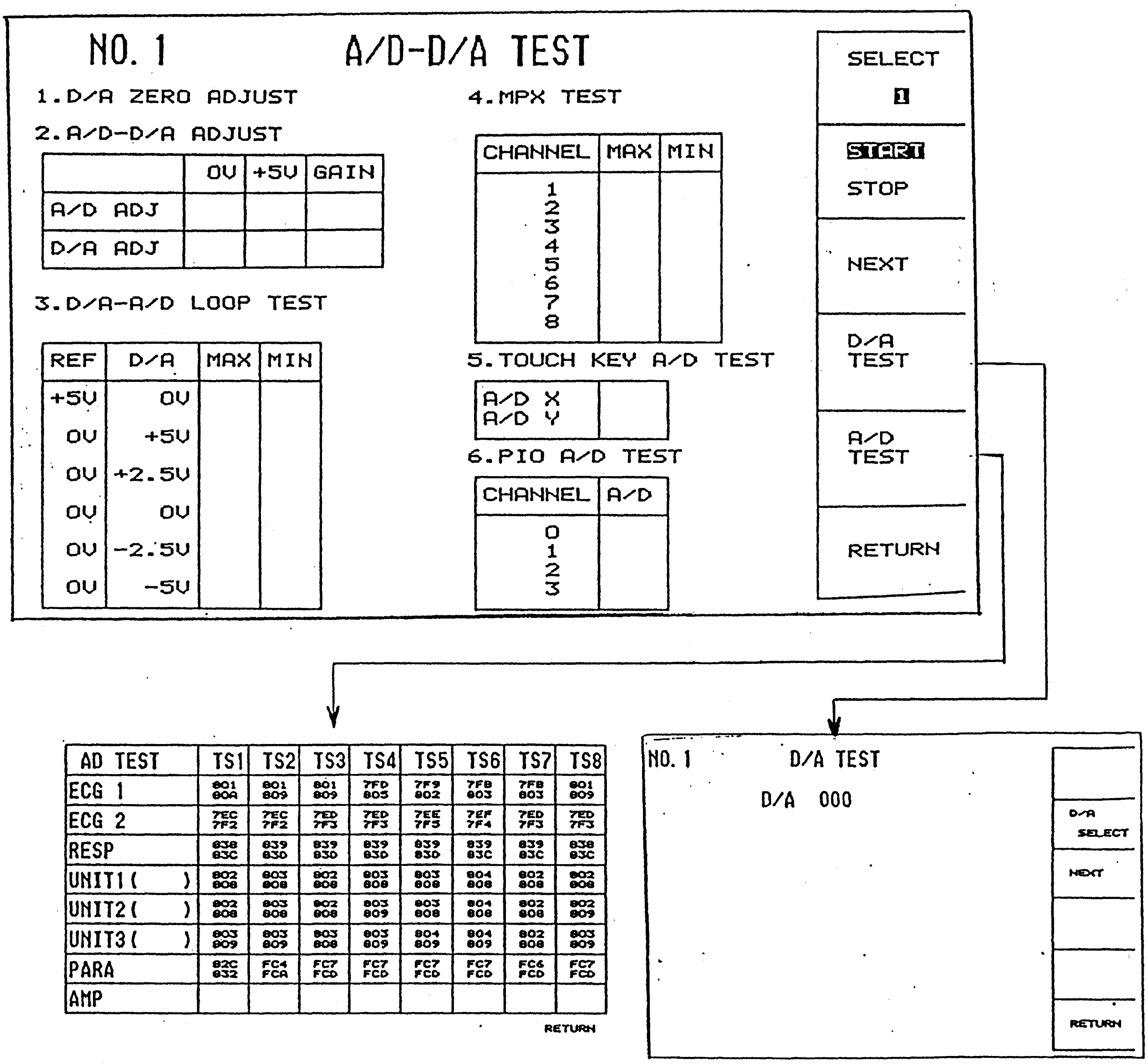


```
                  *** SYSTEM SETUP ***
 1.COMMUNICATION TYPE-JJ800       17.
 2.BED NAME------------BED-001    18.ECG ELECTRODE------IEC/AHA
 3.ASYSTOLE ALARM------ON/OFF     19.
 4.V.FIB ALARM---------ON/OFF     20.RS232C USAGE-------
 5.V.TACHY ALARM-------ON/OFF     21.PC SETUP-----------[←→]
 6.SUSPEND TIME--------3min       22.KEY NAME AUTO FADE-ON/OFF
 7.BEAT SOUND----------LOW/HIGH   23.PERIODIC FREE------60min
 8.LEADS OFF ALARM-----CONT/ONE   24.
 9.LEAD AUTO CHANGE----ON/OFF     25.NIBP MODE--------ADULT/NEO
10.NOISE ALARM---------ON/OFF     26.IV ALARM-----------ON/OFF
11.SYSTEM ALARM SOUND-ON/OFF      27.
12.RESP TIME CONSTANT-1.5/10sec28.
13.BP AMP FILTER-------10/20Hz    29.ALTITUDE-----------0000ft
14.TEMPERATURE UNIT----°C/°F      30.LANGUAGE-----------J/E
15.LENGTH UNIT---------cm/in      31.
16.WEIGHT UNIT---------kg/lb      32.DATA OUTPUT TYPE---03
                                     VPC,ECG,BP1,BP2,
                                     BP3,ADULT,
```

. A/D, D/A test

A/D, D/A test start by pressing the DISPLAY key. The screen has two sub screens for A/D test and D/A test for adjustment. Refer to pages for adjustment in details.

Select one of six items by pressing the SUSPEND key to check A/D conversion of reference voltages whether the A/D data are in specified normal ranges or A/D conversion when screen is touched is correct.



NO. 1 A/D-D/A TEST

1.D/A ZERO ADJUST

2.A/D-D/A ADJUST

	0V	+5V	GAIN
A/D ADJ			
D/A ADJ			

3.D/A-A/D LOOP TEST

REF	D/A	MAX	MIN
+5V	0V		
0V	+5V		
0V	+2.5V		
0V	0V		
0V	-2.5V		
0V	-5V		

4.MPX TEST

CHANNEL	MAX	MIN
1		
2		
3		
4		
5		
6		
7		
8		

5.TOUCH KEY A/D TEST

A/D X A/D Y	

6.PIO A/D TEST

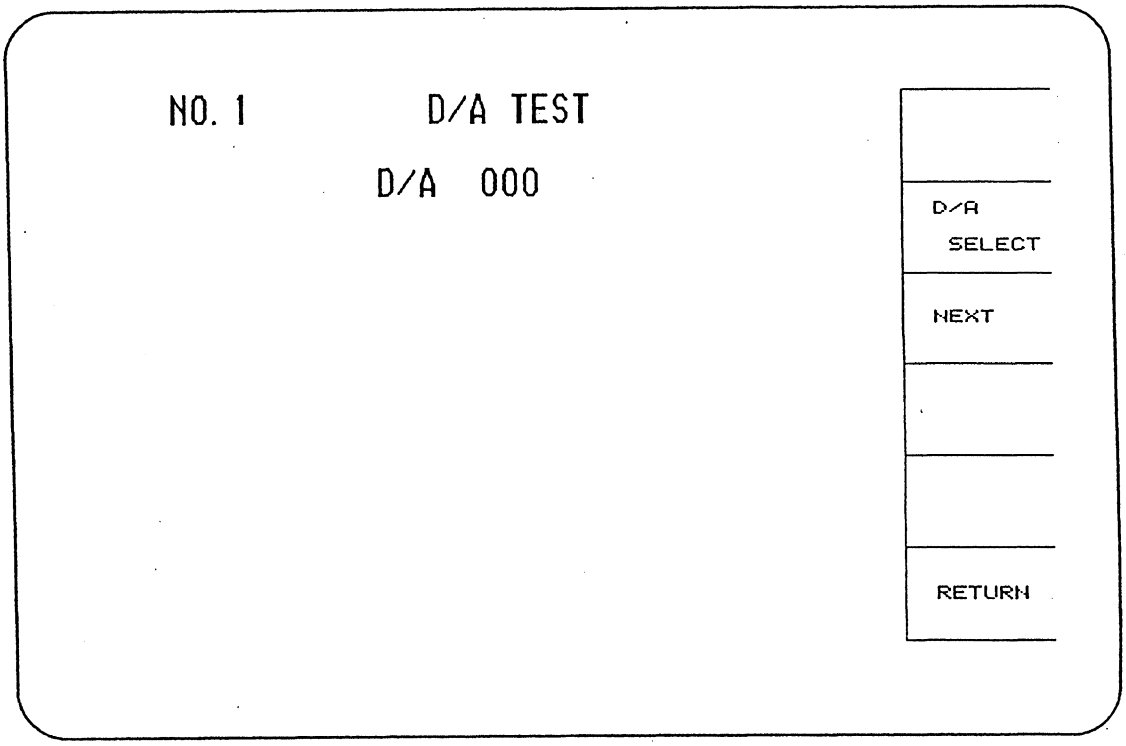
CHANNEL	A/D
0	
1	
2	
3	

AD TEST	TS1	TS2	TS3	TS4	TS5	TS6	TS7	TS8
ECG 1	801 80A	801 809	801 809	7FD 805	7F9 802	7FB 803	7FB 803	801 809
ECG 2	7EC 7F2	7EC 7F2	7ED 7F3	7ED 7F3	7EE 7F5	7EF 7F4	7ED 7F3	7ED 7F3
RESP	838 83C	839 83D	839 83D	839 83D	839 83D	839 83C	839 83C	838 83C
UNIT1 ( )	802 808	803 808	802 808	803 808	803 808	804 808	802 808	802 808
UNIT2 ( )	802 808	803 808	802 808	803 809	803 808	804 808	802 808	802 809
UNIT3 ( )	803 809	803 809	803 808	803 809	804 809	804 809	802 808	803 809
PARA	82C 832	FC4 FCA	FC7 FCD	FC7 FCD	FC7 FCD	FC7 FCD	FC6 FCD	FC7 FCD
AMP								

NO. 1 D/A TEST

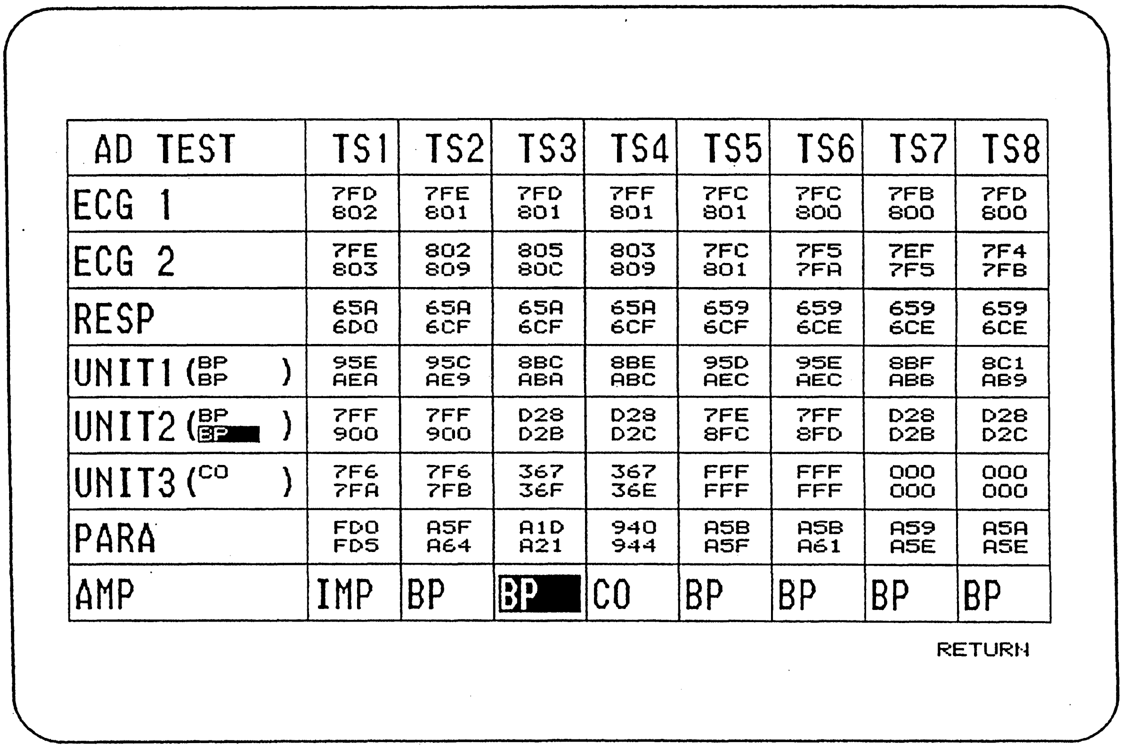
D/A 000

Sub screen for D/A test is called up by pressing the RECORD key and sub screen for D/A screen is called up by pressing the INTERBED key. DISPLAY key returns the screen to the No.1 screen.



NO. 1 D/A TEST

D/A 000



AD TEST	TS1	TS2	TS3	TS4	TS5	TS6	TS7	TS8
ECG 1	7FD 802	7FE 801	7FD 801	7FF 801	7FC 801	7FC 800	7FB 800	7FD 800
ECG 2	7FE 803	802 809	805 80C	803 809	7FC 801	7F5 7FA	7EF 7F5	7F4 7FB
RESP	65A 6D0	65A 6CF	65A 6CF	65A 6CF	659 6CF	659 6CE	659 6CE	659 6CE
UNIT1 (BP BP)	95E AEA	95C AE9	8BC ABA	8BE ABC	95D AEC	95E AEC	8BF ABB	8C1 AB9
UNIT2 (BP BP)	7FF 900	7FF 900	D28 D2B	D28 D2C	7FE 8FC	7FF 8FD	D28 D2B	D28 D2C
UNIT3 (CO)	7F6 7FA	7F6 7FB	367 36F	367 36E	FFF FFF	FFF FFF	000 000	000 000
PARA	FD0 FD5	A5F A64	A1D A21	940 944	A5B A5F	A5B A61	A59 A5E	A5A A5E
AMP	IMP	BP	BP	CO	BP	BP	BP	BP

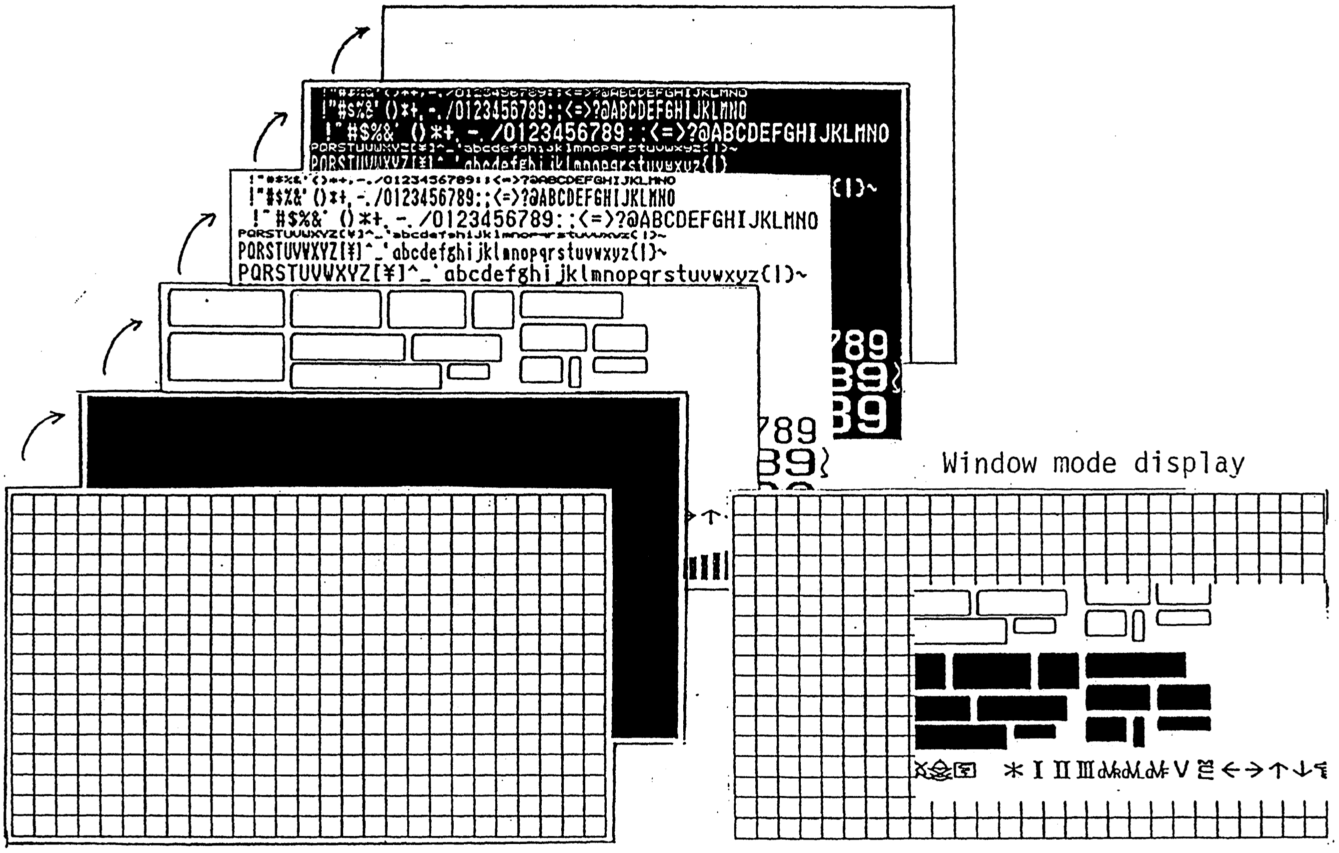
2) Character test screen (No.2)

On this screen, CRT controller LSI device and graphic RAM on the CRTC board are tested. Display mode changes by pressing the key on the front panel.

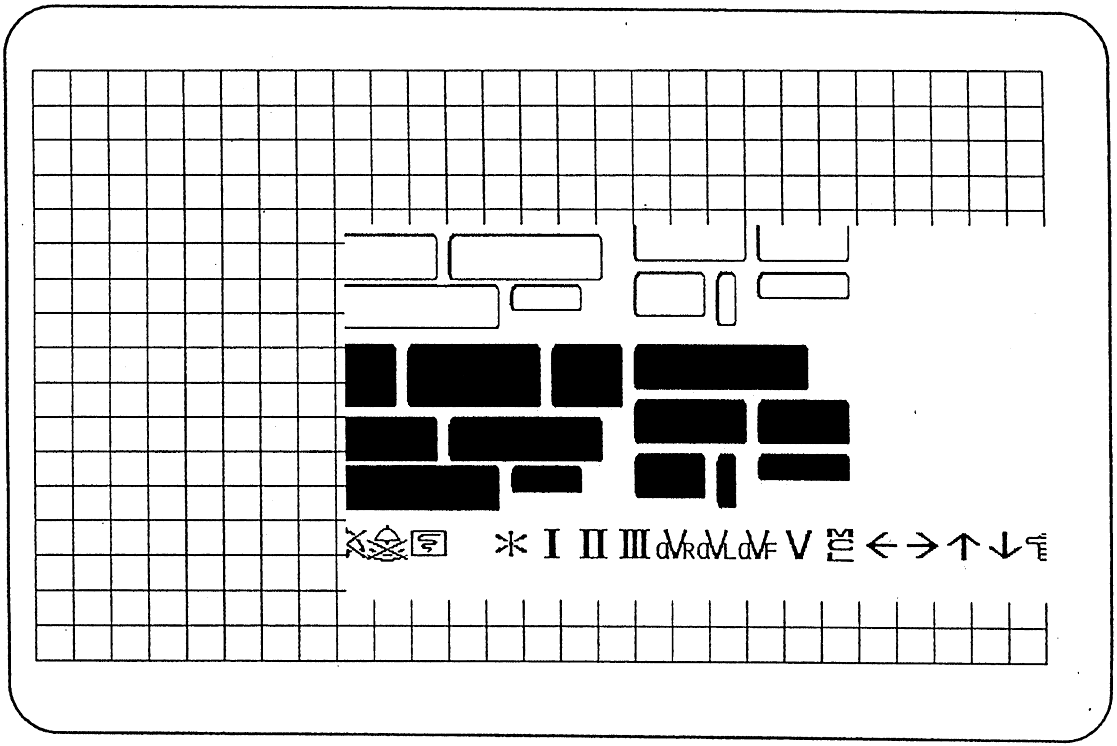
Function of each key is as follows:

SUSPEND	Screen brightness changes at each time the SUSPEND key is pressed to Off → half brightness → full brightness-1 → full brightness-2. Note: There is no difference on the screen between full brightness-1 and -2.
FREEZE	Scrolls the screen up.
TEST	Proceeds the screen to No.3 screen.
RECORD	Scrolls the screen down.
INTERBED	Screen changes at each time the INTERBED key is pressed to Sleep mode → Window mode → Normal mode.
DISPLAY	Screen changes at each time the DISPLAY key is pressed to Grid → Full raster → Character-1 and -2 → reverse shaded character-2 → External input.

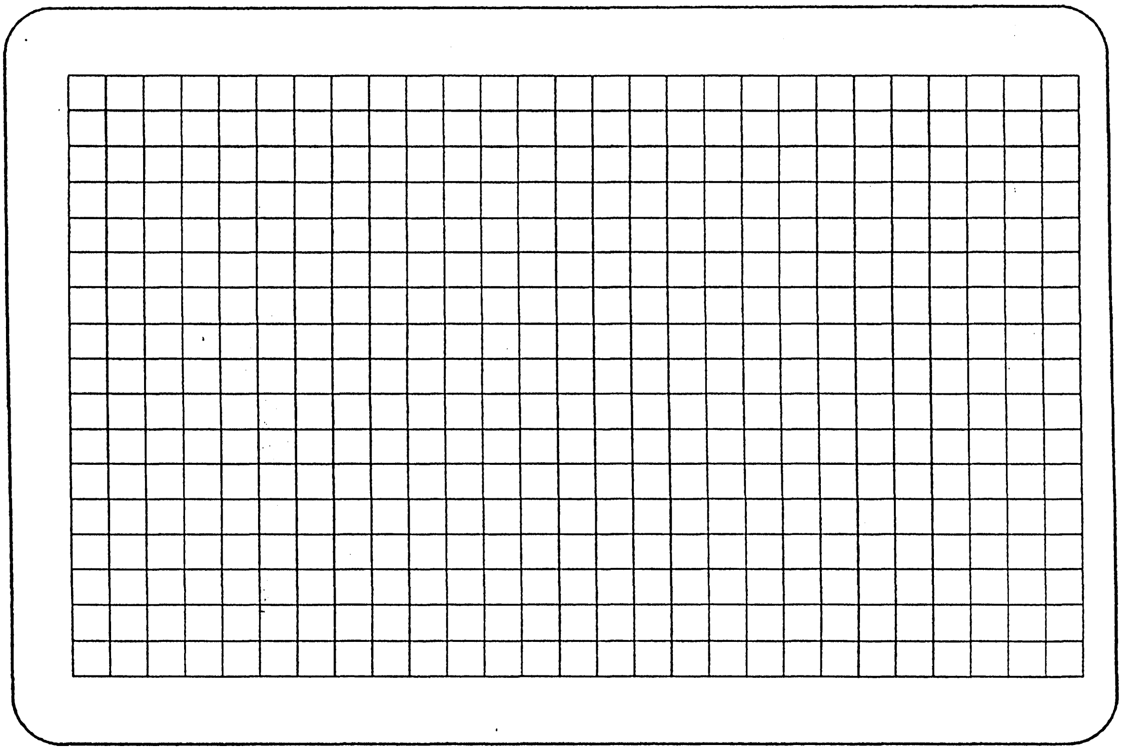
This test is done by eye inspection for screen size, grid distortion, character missing, screen brightness, and display mode changing.



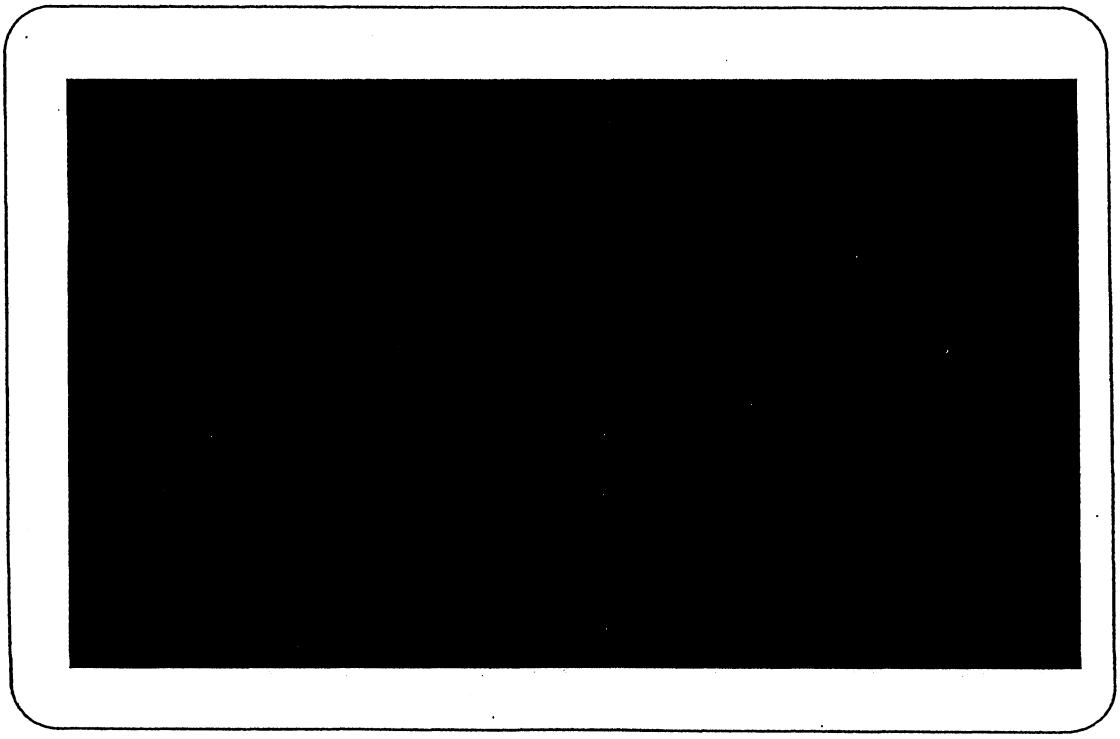
Window mode screen


* I II III aVR aVL aVF V ← → ↑ ↓

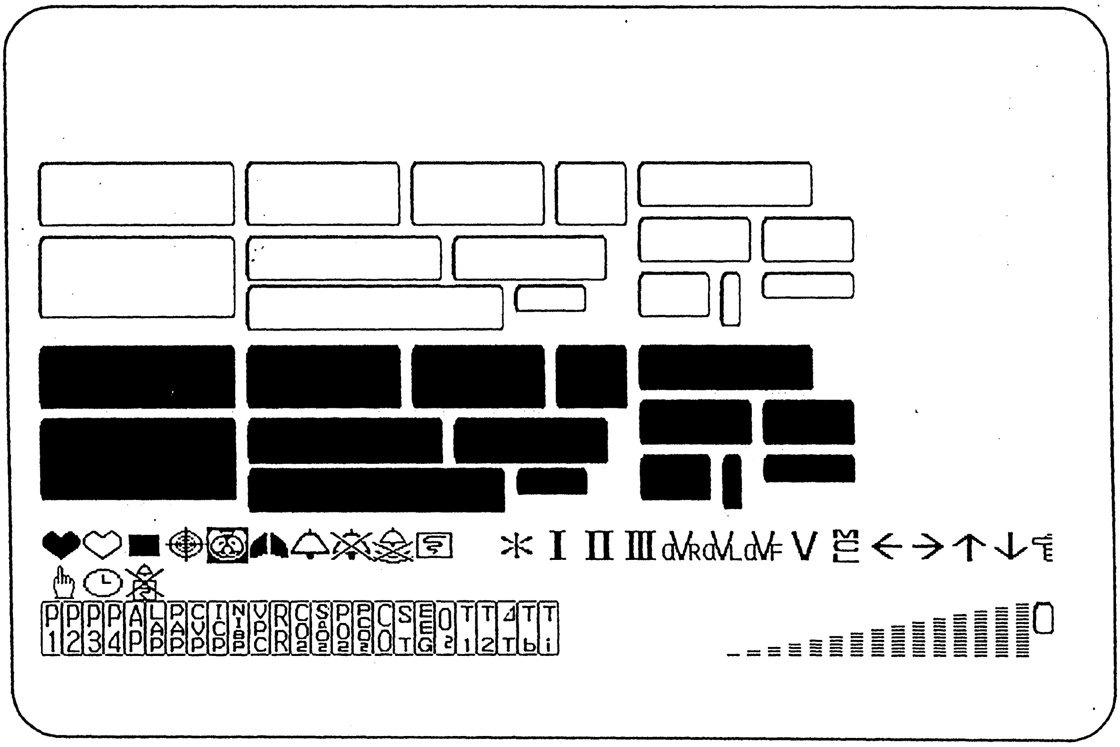
Grid mode screen



Full raster mode screen

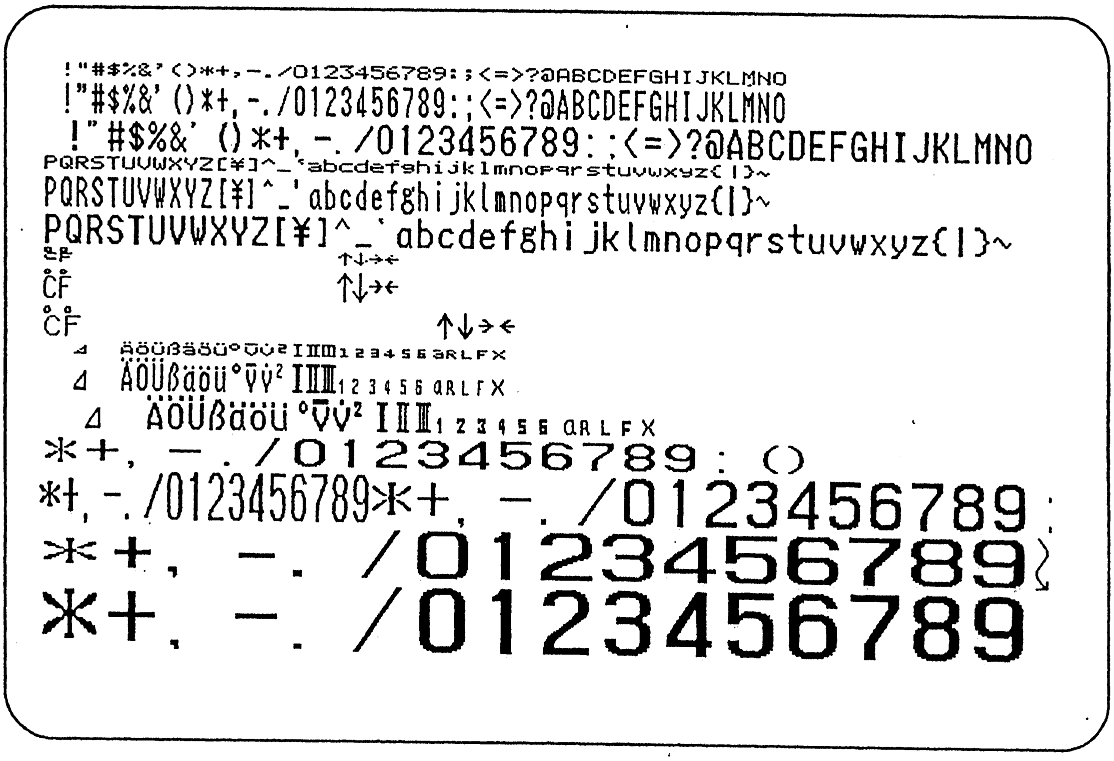


Character-1 mode screen



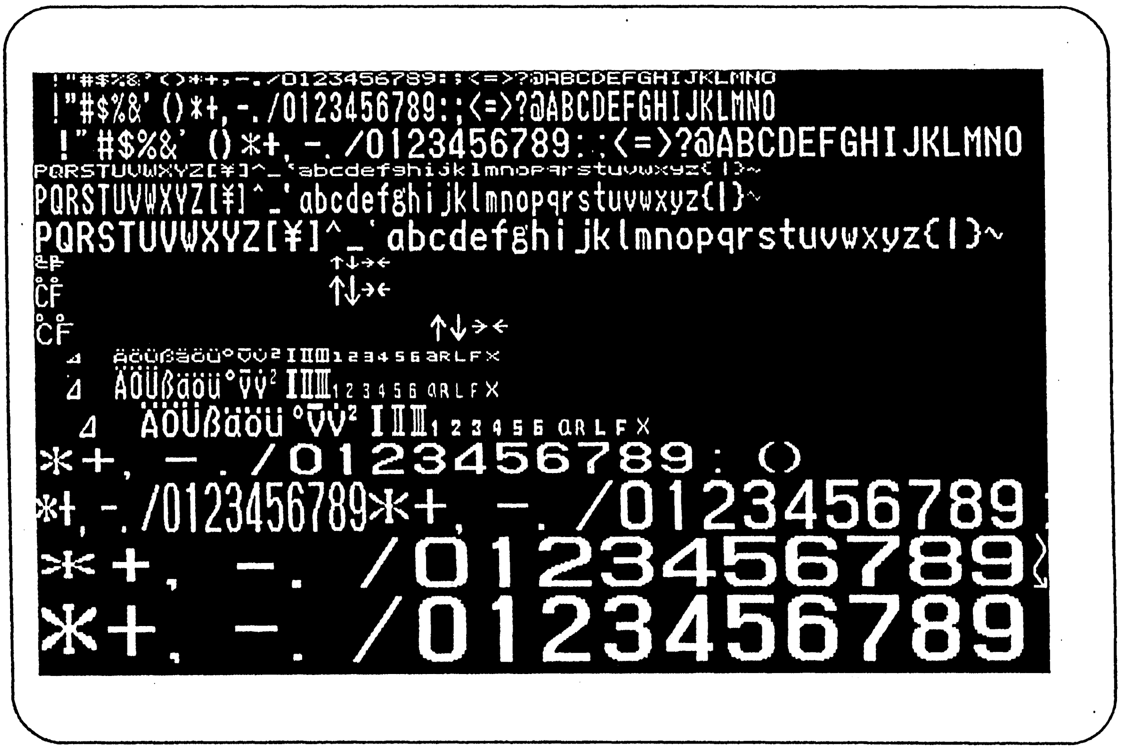
I II III dVRdVLdVF V
P1 P2 P3 P4 ALP ARP CVP IMP NCR VPR RCR S2 P2 B2 OT SEG 02 T1 T2 T Tb Ti
0

Character-2 mode screen



```
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO
PQRSTUVWXYZ[¥]^_`abcdefghijklmnopqrstuvwxyz{|}~
PQRSTUVWXYZ[¥]^_`abcdefghijklmnopqrstuvwxyz{|}~
PQRSTUVWXYZ[¥]^_`abcdefghijklmnopqrstuvwxyz{|}~
°C°F                 ↑↓→←
°C°F                 ↑↓→←
°C°F                       ↑↓→←
⊿  ÄÖÜßäöü°V̄V²ⅠⅡⅢ123456aRLFX
⊿  ÄÖÜßäöü°V̄V²ⅠⅡⅢ123456aRLFX
⊿  ÄÖÜßäöü°V̄V²ⅠⅡⅢ123456aRLFX
*+, -./0123456789:()
*+,-./0123456789*+, -./0123456789:
*+, -. /0123456789
*+, -. /0123456789
```

Reverse shaded character-2 mode screen



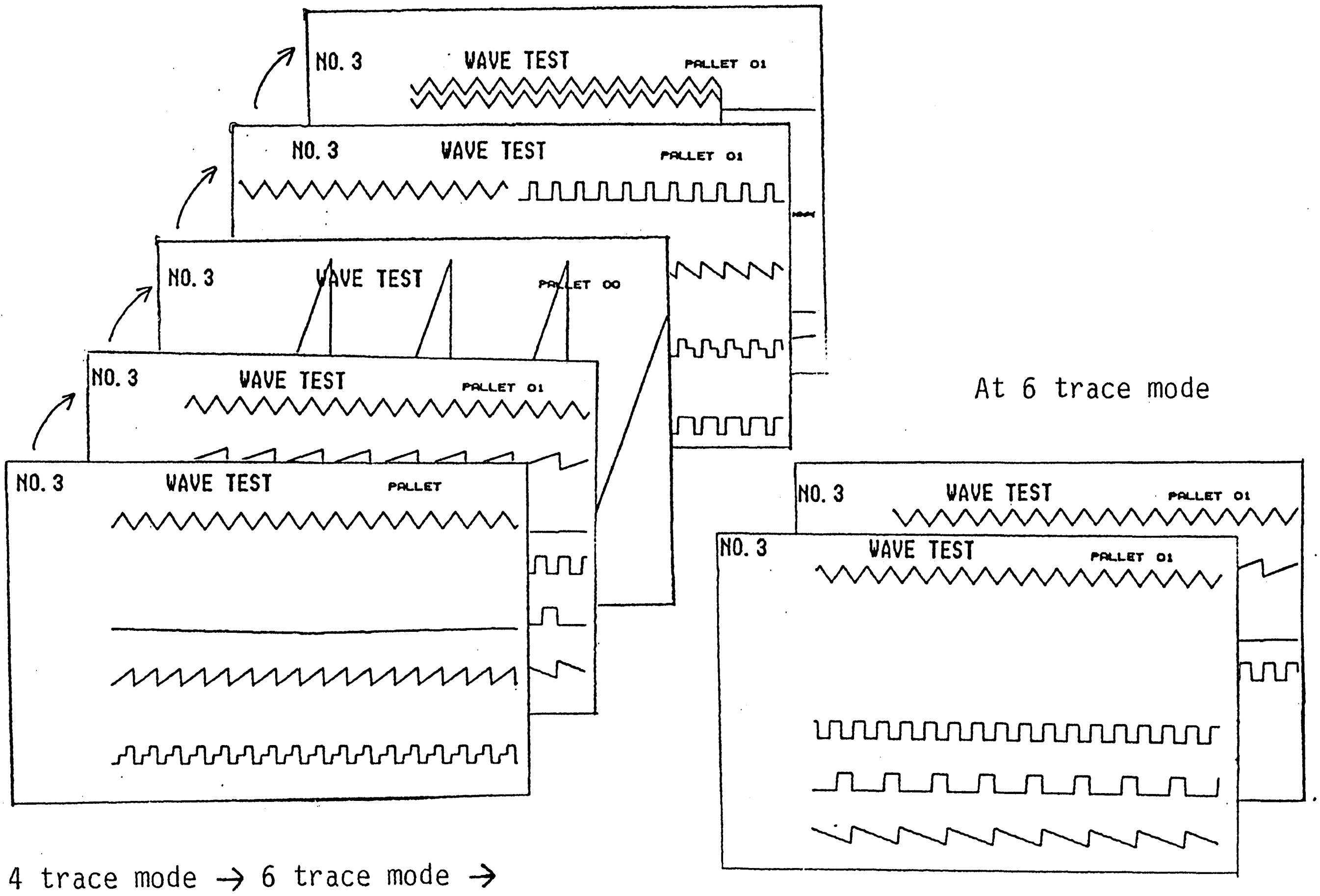
```
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO
PQRSTUVWXYZ[¥]^_`abcdefghijklmnopqrstuvwxyz{|}~
PQRSTUVWXYZ[¥]^_`abcdefghijklmnopqrstuvwxyz{|}~
PQRSTUVWXYZ[¥]^_`abcdefghijklmnopqrstuvwxyz{|}~
℃F              ↑↓→←
℃F              ↑↓→←
℃F                    ↑↓→←
  ⊿  ÄÖÜßäöü°V̄V̇²ⅠⅡⅢ123456aRLFX
  ⊿  ÄÖÜßäöü°V̄V̇²ⅠⅡⅢ123456aRLFX
   ⊿   ÄÖÜßäöü°V̄V̇²ⅠⅡⅢ123456aRLFX
*+,-./0123456789:()
*+,-./0123456789*+,-./0123456789
*+,-./0123456789
*+,-./0123456789
```

3) Wave test screen (No.3)

On this test screen, waveform generator circuit, wave RAM and frame buffer RAM are tested. Function of each key is as follows:

SUSPEND	Brightness of each waveform trace changes one by one at each time the SUSPEND key is pressed to Off → Half brightness → Full brightness-1 → Full brightness-2.
FREEZE	Waveform scrolling stops.
TEST	Proceeds the screen to No.4 screen.
RECORD	Trace brightness on and off of each trace.
INTERBED	At 4 trace mode; selection of 20 dots/mm or 10 dots/mm. At 6 trace mode; trace brightness on/off of 2nd/3rd traces, and 5th/6th traces.
DISPLAY	Selection of 4 trace mode → 6 trace mode → full amplitude → 8 trace mode → A/D mode.

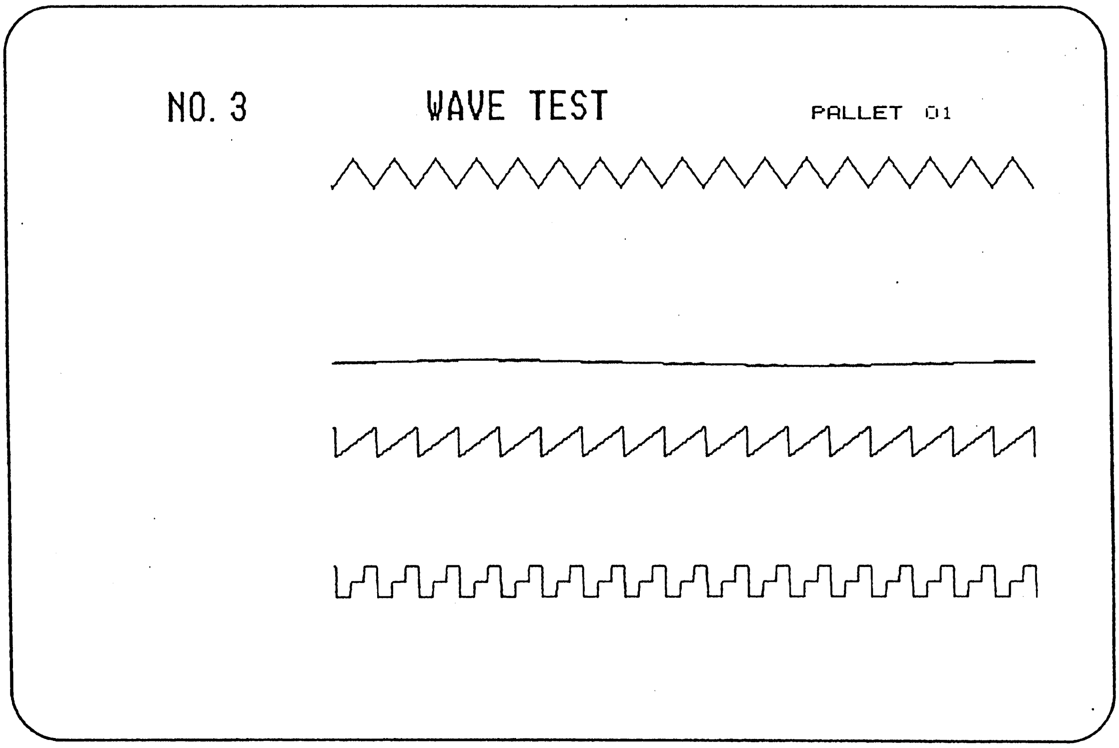
At 4 trace mode of wave test screen, display is done by switching palette.



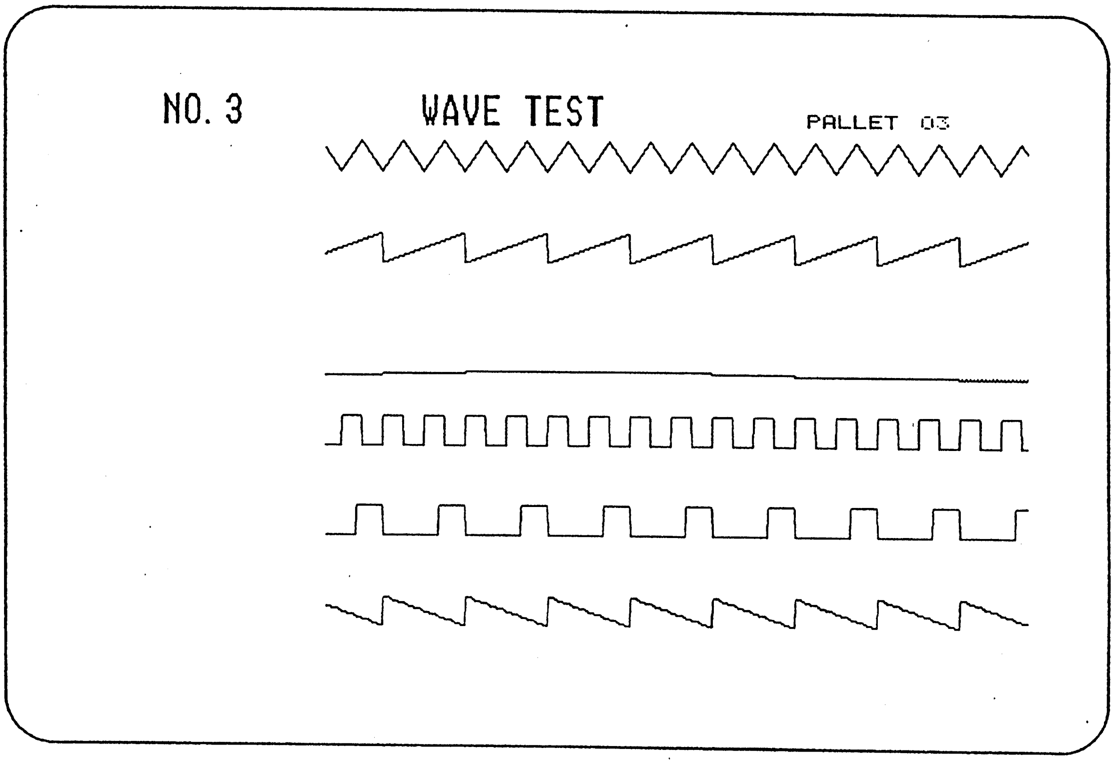
4 trace mode → 6 trace mode → full amplitude → 8 trace mode → A/D mode

trace brightness on/off of 2nd/3rd traces, and 5th/6th traces

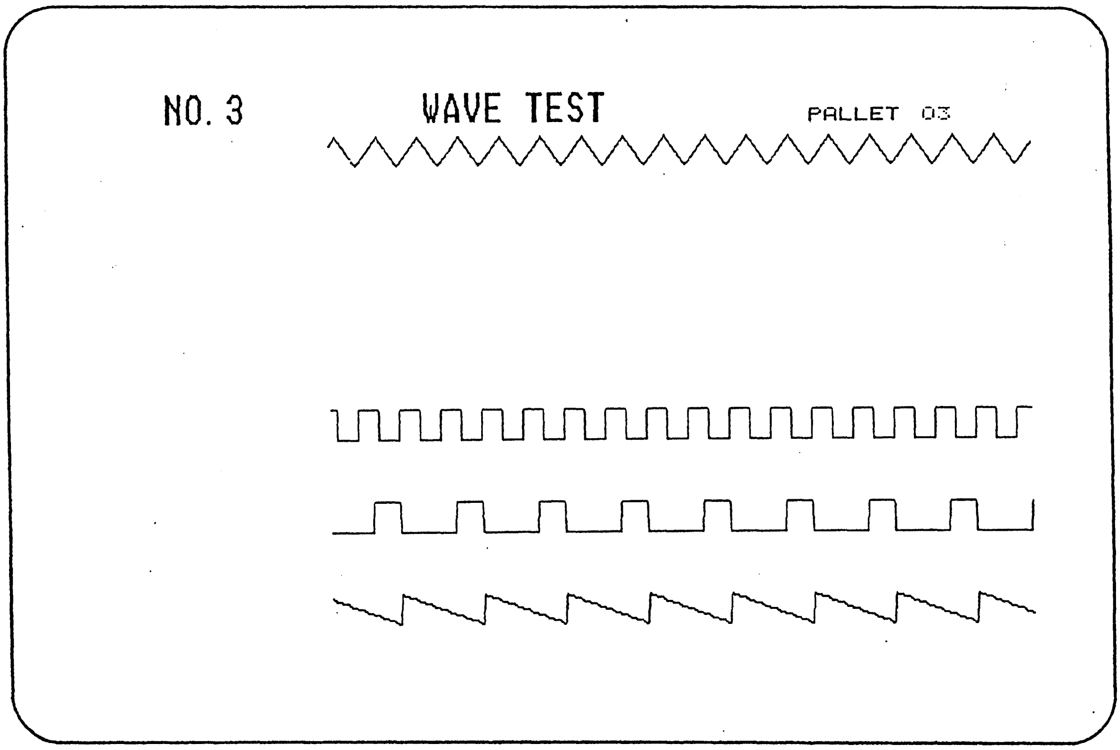
4 trace mode screen


NO. 3
WAVE TEST
PALLET 01

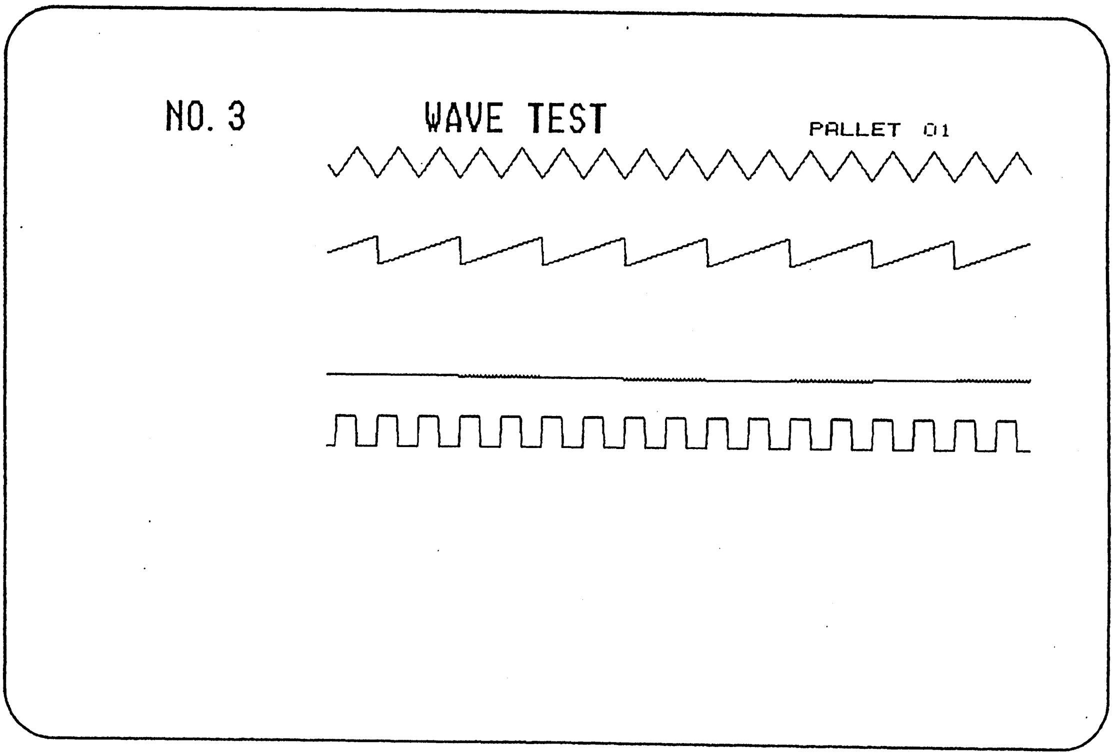
6 trace mode screen (base)


NO. 3
WAVE TEST
PALLET 03

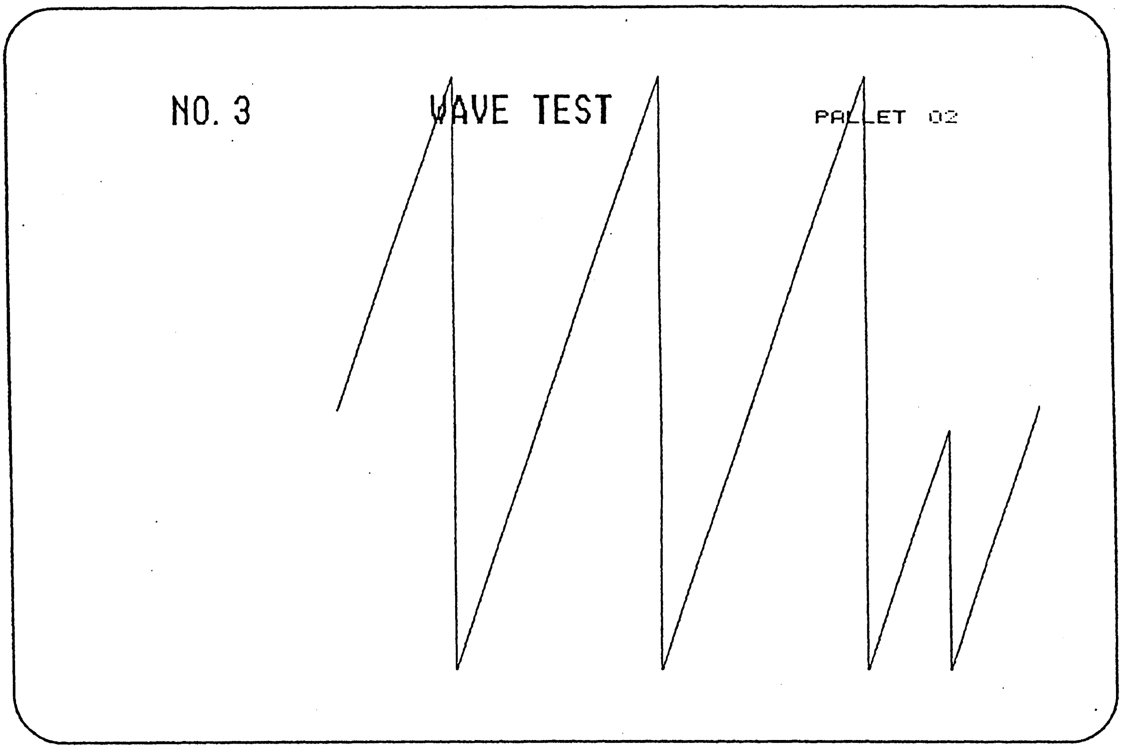
6 trace mode screen-1


NO. 3
WAVE TEST
PALLET 03

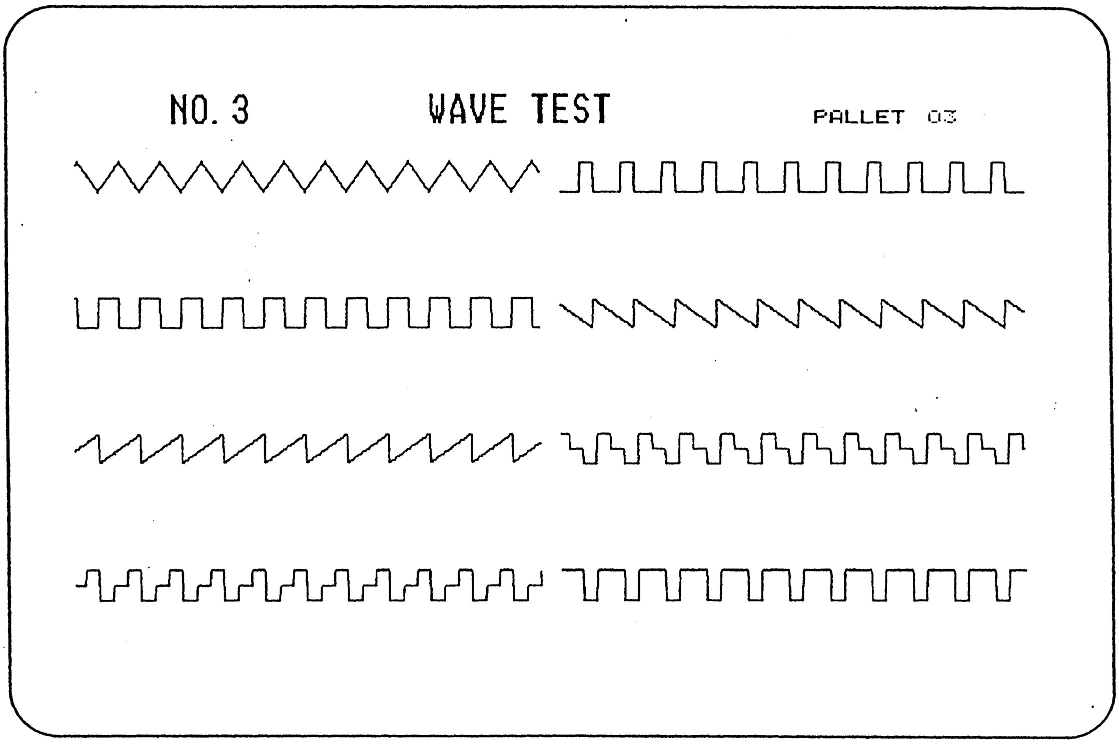
6 trace mode screen-2


NO. 3
WAVE TEST
PALLET 01

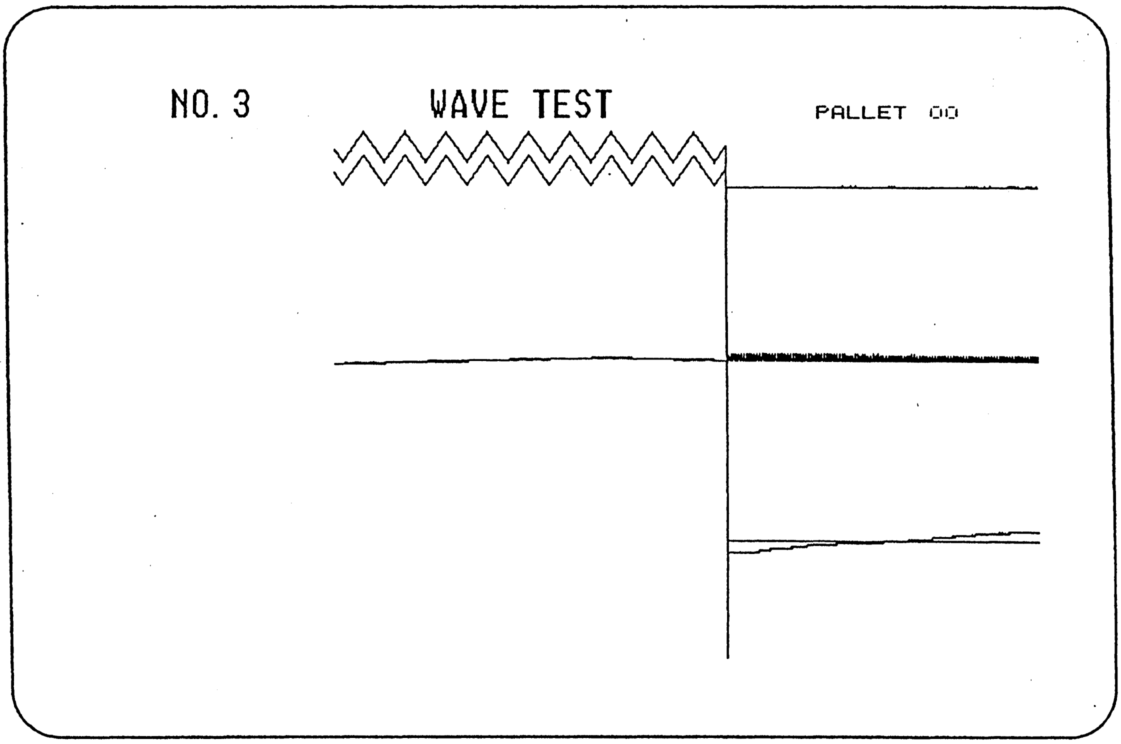
Full amplitude mode screen


NO. 3
WAVE TEST
PALLET 02

8 trace mode screen

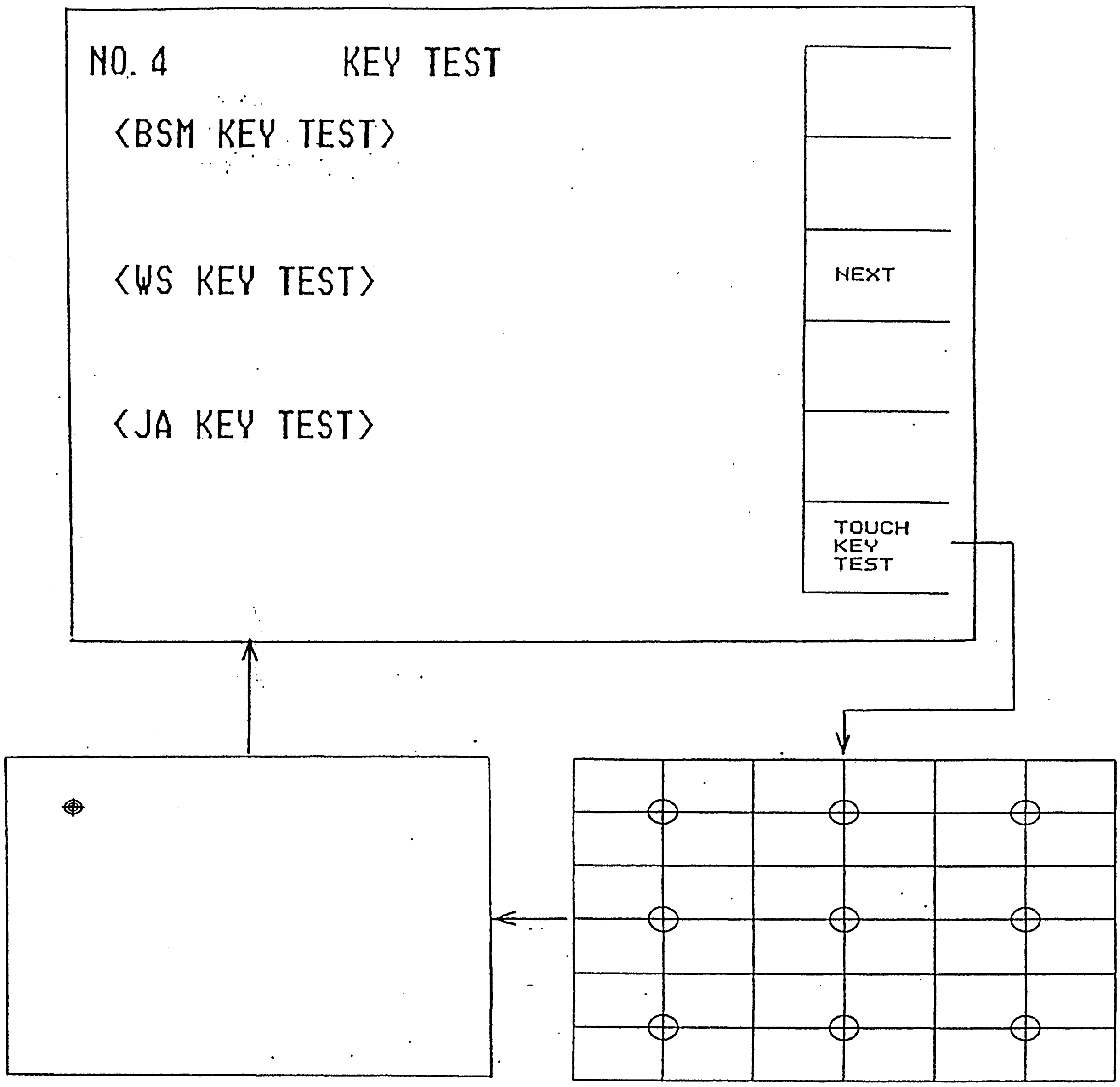

NO. 3
WAVE TEST
PALLET 03

A/D mode screen


NO. 3
WAVE TEST
PALLET 00

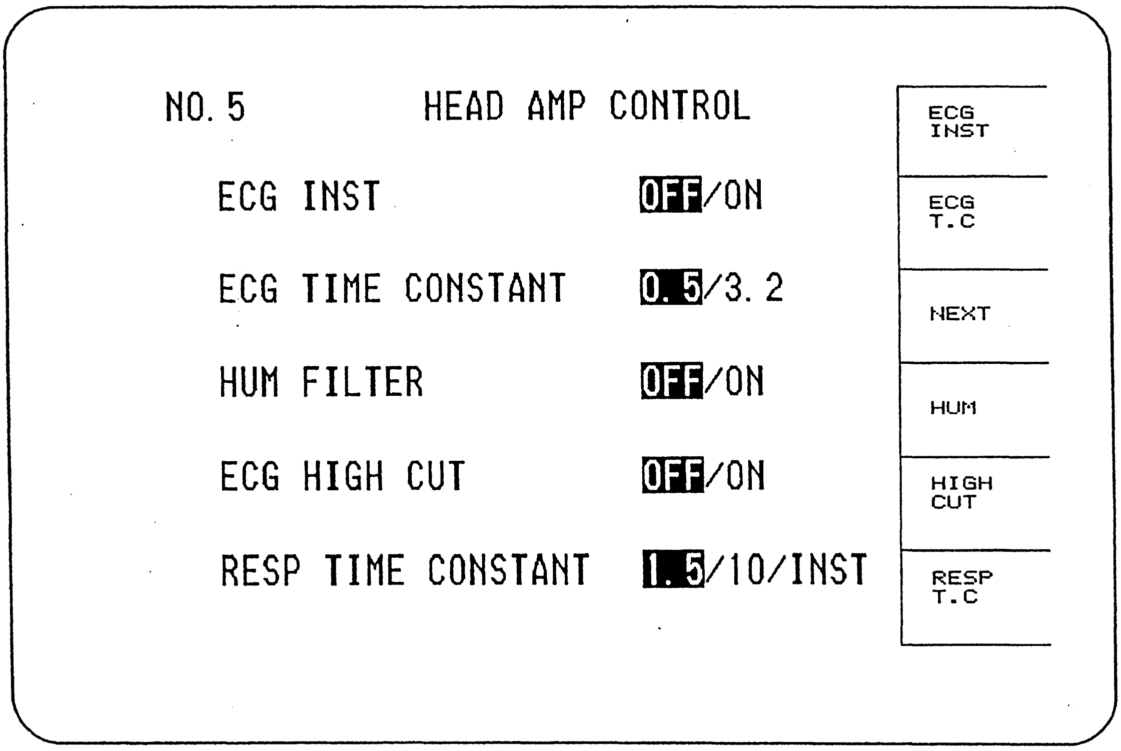
4) Key test screen (No.4)

This screen is to inspect key operation of the bedside monitor main unit, external recorder, extension input box. Screen displays the key name being pressed. Pressing the DISPLAY key calls up TOUCH-KEY TEST mode. Confirm that mark "⊕" is displayed behind the surface of the touch-key panel being pressed. If the mark does not coincide to the surface being pressed, press the DISPLAY key again to set the screen to TOUCH-KEY DATA SETUP mode. Press the surface of the touch-key panel where the mark "⊕" is displayd. After setting all points press the DISPLAY key again to return to the No.4 screen.



5) Head amplifier control screen (No.5)

By changing time constant and setting filter on or off, ECG/Respiration circuits are tested. Refer to pages for adjustment in details.



NO. 5 HEAD AMP CONTROL

ECG INST OFF/ON

ECG TIME CONSTANT 0. 5/3. 2

HUM FILTER OFF/ON

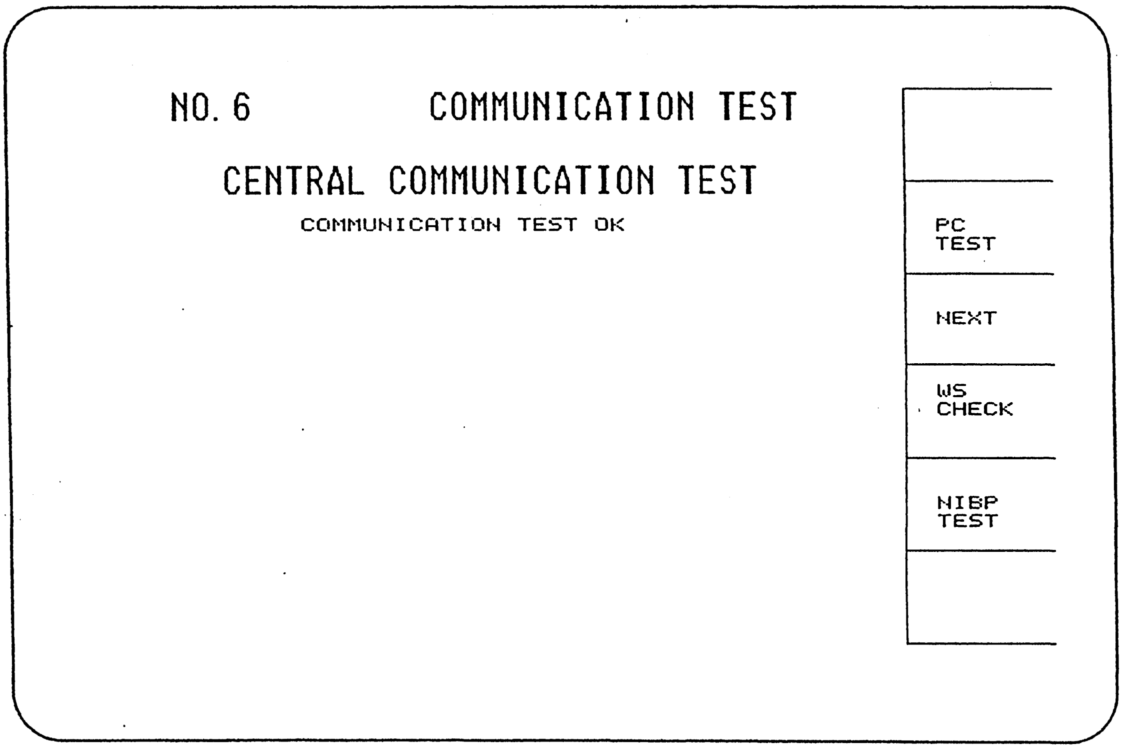
ECG HIGH CUT OFF/ON

RESP TIME CONSTANT 1. 5/10/INST

ECG INST
ECG T.C
NEXT
HUM
HIGH CUT
RESP T.C

6) Communication test screen (No.6)

Communication between an external instrument is tested via the optional interface board. If there is no central monitor interface, "NO BAORD" is displayed. When central monitor including MU-820R central monitor main unit and JJ-810/820R signal exchanger) is connected, "COMMUNICATION TEST OK" appears in 3 to 5 seconds.



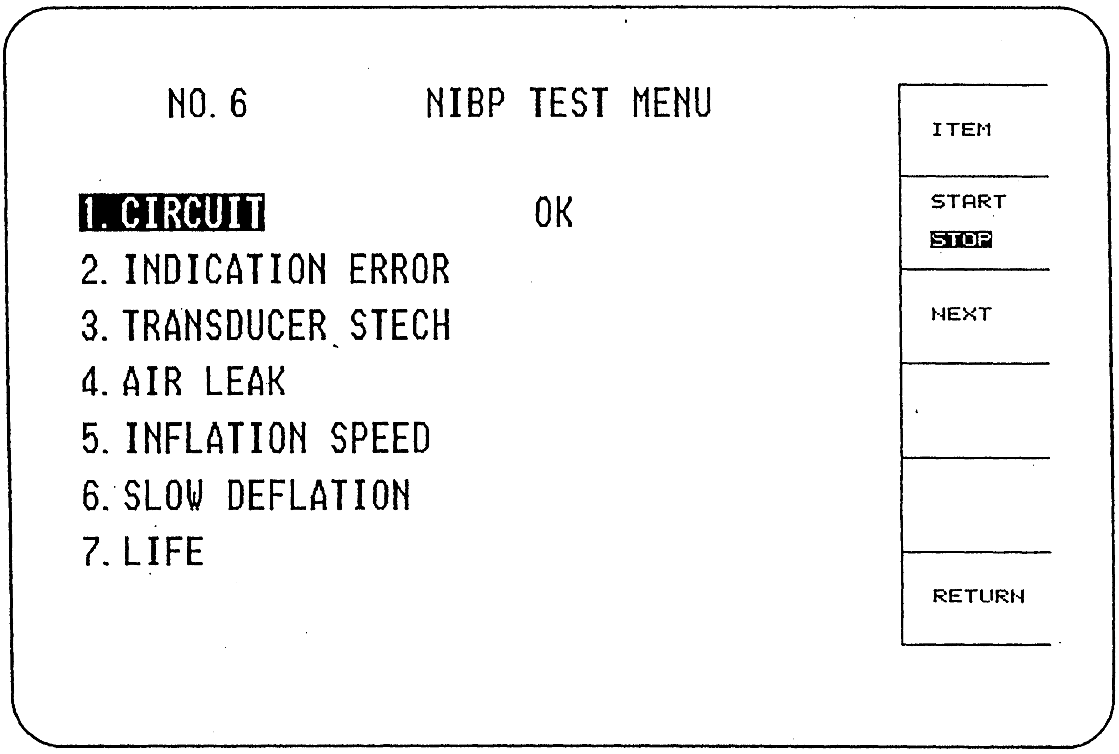
NO. 6 COMMUNICATION TEST

CENTRAL COMMUNICATION TEST

COMMUNICATION TEST OK

NIBP test

NIBP test screen is called up by pressing the INTERBED key. NIBP test is made between the built-in NIBP unit. NIBP test command is sent to the NIBP test for self test. If communiation is incorrect or the unit is not mounted (MU-832R), "NO MODULE" is displayed. If communication is correct, "OK" appears. Other test items require special jigs. Refer to pages for adjustment in details.



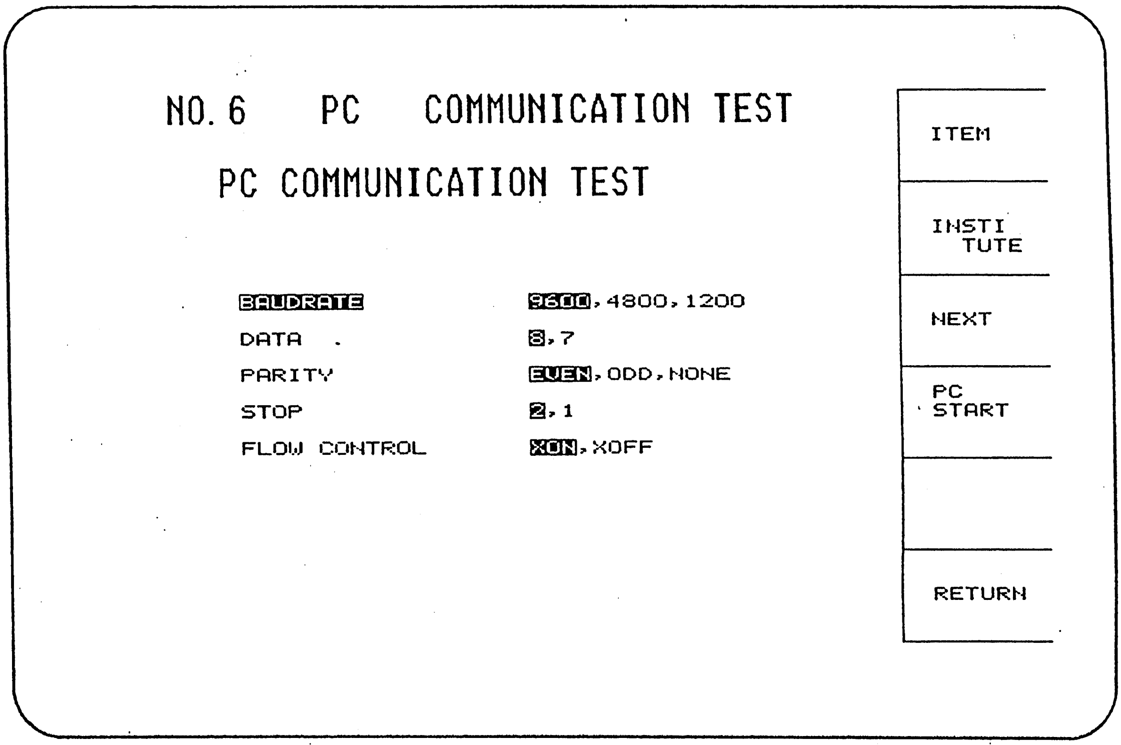
NO. 6 NIBP TEST MENU

1. CIRCUIT OK
2. INDICATION ERROR
3. TRANSDUCER STECH
4. AIR LEAK
5. INFLATION SPEED
6. SLOW DEFLATION
7. LIFE

If the WSIF board (QI-812P) is mounted, the following tests are provided.

. PC communication test

The FREEZE key is indicated with PC TEST and pressing it called up PC communication sub screen. This PC test is for RS-232C port. Special jigs are required for this PC test. Refer to pages for adjustment in details.



NO. 6 PC COMMUNICATION TEST

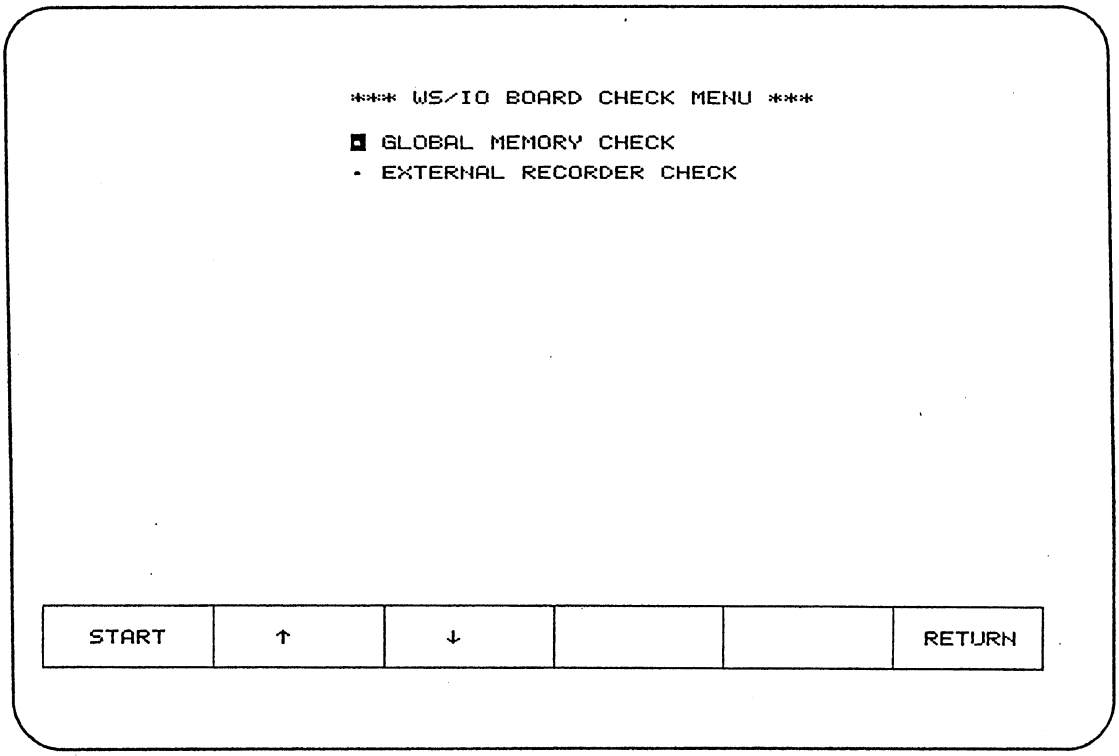
PC COMMUNICATION TEST

BAUDRATE 9600, 4800, 1200
DATA 8, 7
PARITY EVEN, ODD, NONE
STOP 2, 1
FLOW CONTROL XON, XOFF

. WS test

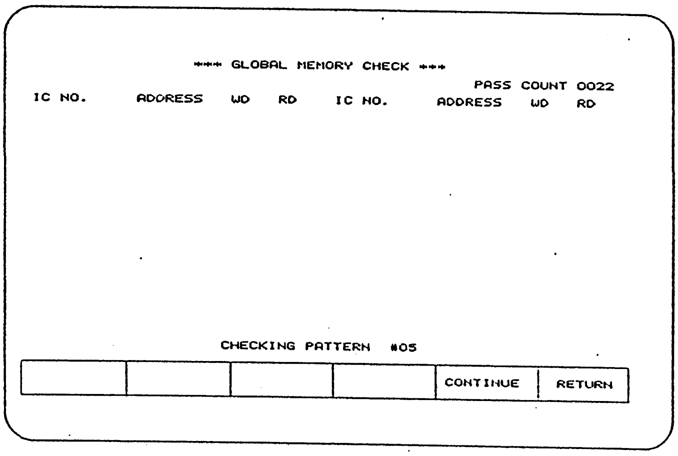
The RECORD key is indicated with WS CHECK and pressing it calls up WS test sub screen. There are two test items. One is dual port memory (global memory) which for inpu/output between the recorder, and the other is actual communication with the recorder. Dual port memory check is done by Write/Read method. Actual communication between the recorder is done by sending record activation commands to the recorder. If the recorder is not connected, "WS CISCONNECTED" appears on the screen.

Press the RETURN key to return the screen mode to the No.6 screen.



*** WS/IO BOARD CHECK MENU ***

■ GLOBAL MEMORY CHECK
· EXTERNAL RECORDER CHECK
START
↑
↓
RETURN



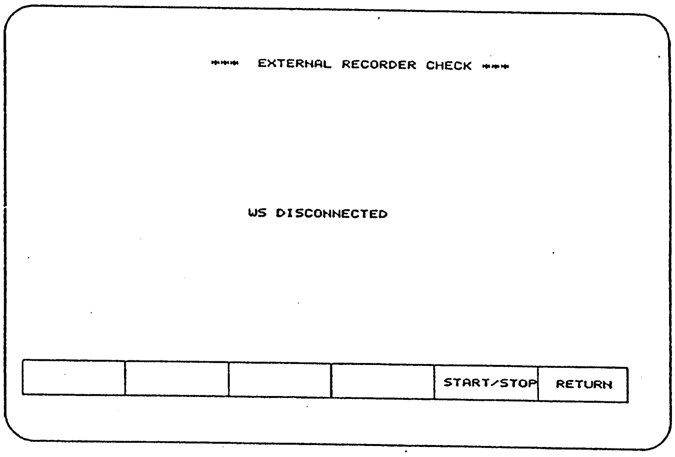
**** GLOBAL MEMORY CHECK ***

PASS COUNT 0022

```
IC NO.     ADDRESS   WD   RD   IC NO.    ADDRESS   WD   RD
```

CHECKING PATTERN #05

CONTINUE
RETURN



**** EXTERNAL RECORDER CHECK ***

WS DISCONNECTED

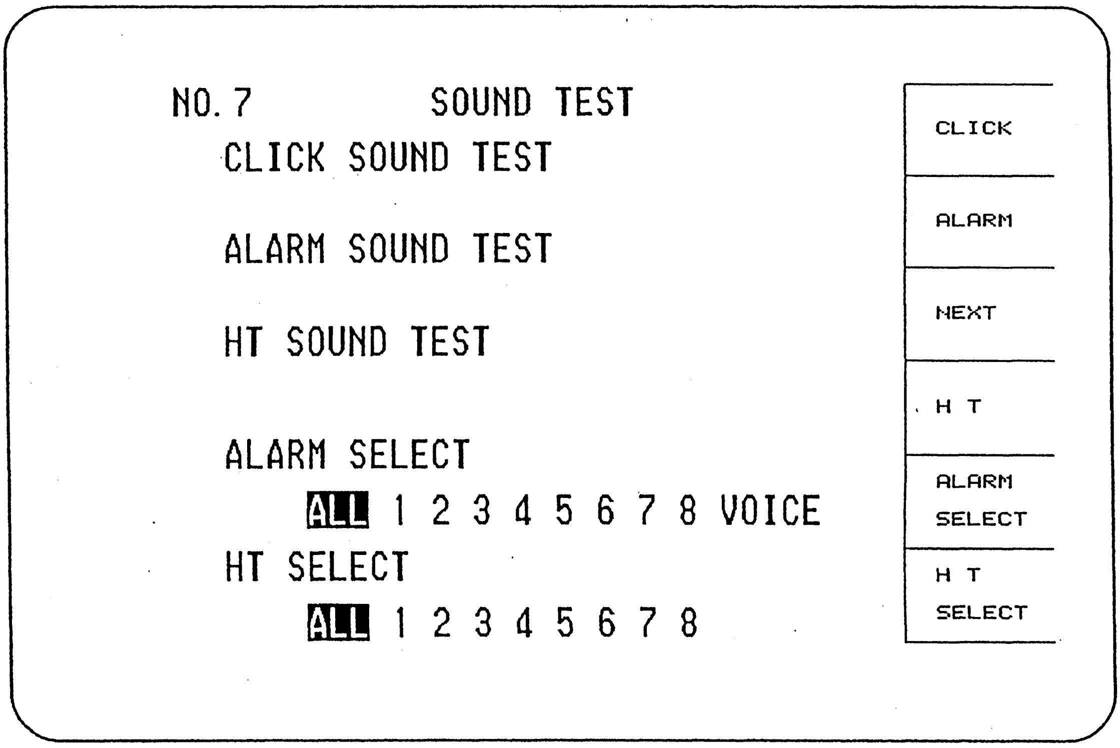
START/STOP
RETURN

7) Sound test screen (No.7)

This screen is for sound related tests.

Function of each key is as follows:

SUSPEND	Generates key touch click tone.
FREEZE	Generates alarm tone.
TEST	Proceeds the screen to No.8 screen.
RECORD	Generates QRS sync. tone.
INTERBED	Selects alarm tone (when ALL, all alarm tones are genereated successively).
DISPLAY	Selects QRS sync. tone (when ALL, all QRS sync. tones are generated successively).



NO. 7 SOUND TEST

CLICK SOUND TEST

ALARM SOUND TEST

HT SOUND TEST

ALARM SELECT

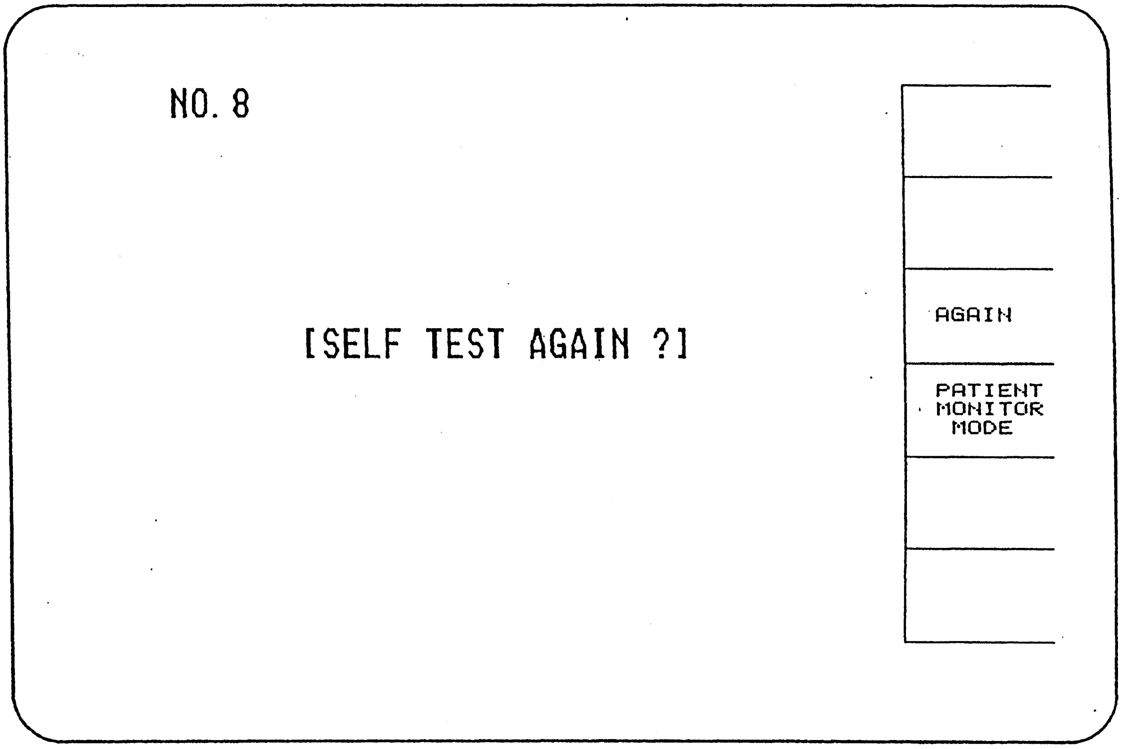
ALL 1 2 3 4 5 6 7 8 VOICE

HT SELECT

ALL 1 2 3 4 5 6 7 8

8) Self test again? screen (No.8)

The last screen of the off-line self test. If the TEST key is pressed, screen returns to the No.1 screen and the self test can be repeated. On the No.1 screen returned from the No.8 screen, power-on test results are of the previously tested ones. If the TEST key is not pressed for several seconds or by pressing the RECORD key, the No.8 screen returns to the normal patient monitoring screen.


NO. 8
[SELF TEST AGAIN ?]
AGAIN
PATIENT MONITOR MODE

Section 3

3. Signal name

NOTE: Top of the component name is the supplier of the signal or power if two or more components are listed for one signal or power.

If two or more same signal names are listed, functions in each PC board are different.

Signals beginning with X mean that the signals function in "active low".

Signal	PC board	Model	Page	Description
+10VREF	MAIN	UP-0397	7/19	Reference voltage for AD/DA converter
+12CRT	CRTC	UP-0398	4/14	Power for CRT unit
	MAIN	UP-0397	19/19	- ditto -
+12SND	CRTC	UP-0398	14/14	Power for audio amplifier
+12VAD	MAIN	UP-0397	14/19	Power for AD/DA converter
+15	MAIN	UP-0397	7/19	Power for head amplifiers
+19	MAIN	UP-0397	7/19	Power for input box extension
+5V	MAIN	UP-0397	2/19	Power for digital devices
	CRTC	UP-0398	1/14	- ditto -
	PIO	UP-0401	1/4	- ditto -
	WSIF	UP-0402	1/3	- ditto -
+5VREF	MAIN	UP-0397	7/19	Reference voltage for head ampl. detection
+8V	MAIN	UP-0397	7/19	Power for analog devices
	PIO	UP-0401	1/4	- ditto -
-12VAD	CRTC	UP-0398	14/14	Power for NIBP data AD conversion
-12VAD	MAIN	UP-0397	14/19	Power for AD/DA conversion
-8V	MAIN	UP-0397	7/19	Power for analog devices
	PIO	UP-0401	1/4	- ditto -
125Hz	MAIN	UP-0397	7/19	Head ampl. detection control signal
12VPUMP	MAIN	UP-0397	19/19	Power for NIBP pump
19.2K	MAIN	UP-0397	1/19	NIBP unit communication sync. clock singal

Signal	PC board	Model	Page	Description
24M	CRTC	UP-0398	1/14	24.576MHz system clock
	MAIN	UP-0397	1/19	- ditto -
250Hz	MAIN	UP-0397	7/19	Head ampl. detection control signal
2CHECG	MAIN	UP-0397	7/19	2 channel ECGs mixed signal
2CLK	CRTC	UP-0398	2/14	ACRTC clock signal
384K	NAIM	UP-0397	1/19	AD control, audio circuit basic clock signal
3M	CRTC	UP-0398	7/14	ACW sync. clock signal
3M	MAIN	UP-0397	1/19	NIBP unit communication basic clock
3M	PIO	UP-0401	1/4	Clock for AD conversion
49M	CRTC	UP-0398	7/14	49.152Mz original system clock sigal
4KHz	MAIN	UP-0397	7/19	ECG signal separation control clock signal
64K	MAIN	UP-0397	7/19	Clock signal for head amplifiers
6M	PIO	UP-0401	1/4	Central communication basic clock signal
768K	MAIN	UP-0397	1/19	Input block control clock signal
8KHz	MAIN	UP-0397	7/19	ECG signal separation control clock signal
96K	MAIN	UP-0397	1/19	DA data output switch clock signal
A/XM	PIO	UP-0401	3/4	Central com. address/message switch control
A/XMR	PIO	UP-0401	3/4	Return line of A/XM signal
A0-A23	MAIN	UP-0397	1/19	Address bus
A00L-A10L	WSIF	UP-0402	3/3	WS address
A01-A18	ROM-P	UP-0520	2/2	Address bus (lower 18 bits)
A01-A23	MAIN	UP-0397	1/19	Address bus
AA0-AA7	CRTC	UP-0398	7/14	A group frame memory address
ADOFSET	MAIN	UP-0397	14/19	AD input offset
ALMSND	MAIN	UP-0397	16/19	Alarm sound
ALPL	PIO	UP-0401	2/4	Alarm pole control output
ALSNDST	MAIN	UP-0397	5/19	Alarm sound generation control signal
ALVOL	MAIN	UP-0397	17/19	Alarm sound signal
ASD0-ASD-3	CRTC	UP-0398	6/14	A group serial data
ATR	CRTC	UP-0398	7/14	Shift register latch timing signal
AUX1IN	PIO	UP-0401	3/4	Aux. input 1
AUX2IN	PIO	UP-0401	3/4	Aux. input 2
AUXW	WSIF	UP-0402	1/3	Aux. waveform output
AV	CRTC	UP-0398	9/14	A group video signal
AVO	CRTC	UP-0398	4/14	A group signal output
B	CRTC	UP-0398	4/14	Slave monitor "BLUE" output (digital)
B-BECG	WSIF	UP-0402	1/3	Interbed ECG waveform
B.V.	MAIN	UP-0397	11/19	Battery voltage monitor signal
BATT	MAIN	UP-0397	1/19	Battery voltage
BCONT	CRTC	UP-0398	1/14	CPU bus control signal
BLUE	CRTC	UP-0398	4/14	Slave monitor "BLUE" output (analog)
BSD0-BSD3	CRTC	UP-0398	6/14	B group serial data
BUC0	CRTC	UP-0398	5/14	Even word bus control
BUC1	CRTC	UP-0398	5/14	Odd word bus control
BV	CRTC	UP-0398	11/14	B group video signal

Signal	PC board	Model	Page	Description
BVO	CRTC	UP-0398	4/14	B group signal output
CAL	MAIN	UP-0397	10/19	ECG calibration voltage (15mV)
CAS	CRTC	UP-0398	7/14	Colomun address strobe signal (frame memory)
CLICK	MAIN	UP-0397	5/19	Key clock tone control signal
CLOCK	MAIN	UP-0397	5/19	Clock adjustment terminal
CONT1, 2	MAIN	UP-0397	7/19	Head amplifier control singals (spare)
CPUCLK	PIO	UP-0401	1/4	CPU clock signal
CPUCLK	CRTC	UP-0398	1/14	- ditto -
CPUCLK	MAIN	UP-0397	1/19	- ditto -
CPUCLK	WSIF	UP-0402	1/3	- ditto -
CV	MAIN	UP-0397	4/19	Capacitor voltage for RAM data backup
D00-D15	MAIN	UP-0397	1/19	Data bus
	ROM-P	UP-0520	2/2	- ditto -
DAS0-3	CRTC	UP-0398	6/14	Delayed A group serial data
DATIN	MAIN	UP-0397	8/19	DA conversion timing signal
DAV	CRTC	UP-0398	10/14	Delayed A group video signal
DAVO	CRTC	UP-0398	4/14	Delayed A group signal output
DBSD0-3	CRTC	UP-0398	4/14	Delayed B group serial data
DBV	CRTC	UP-0398	12/14	Delayed B group video signal
DBVO	CRTC	UP-0398	4/14	Delayed B group signal output
DGD0-DGD15	CRTC	UP-0398	6/14	Delayed waveform data
DOTCLK	CRTC	UP-0398	8/14	Dot clock
DOTCLK0	CRTC	UP-0398	8/14	Dot clock
DOTCLK1	CRTC	UP-0398	8/14	Dot clock
DSLD	CRTC	UP-0398	6/14	Waveform data conversion start signal (delay)
DSP1	CRTC	UP-0398	8/14	Drawing timing signal
DSP1G	CRTC	UP-0398	6/14	Drawing timing signal output
DT/OE	CRTC	UP-0398	7/14	Data/Output enable signal (frame memory)
E1	MAIN	UP-0397	7/19	Analog ground
	PIO	UP-0401	2/4	- ditto -
E2	PIO	UP-0401	2/4	Digital ground
E3	MAIN	UP-0397	7/19	+19V ground
ECG1	MAIN	UP-0397	7/19	ECG1 waveform (15mV/mV)
ECG2	MAIN	UP-0397	7/19	ECG2 waveform (15mV/mV)
ECRT	MAIN	UP-0397	19/19	CRT unit ground
ECRT	CRTC	UP-0398	4/14	- ditto -
EH	MAIN	UP-0397	7/19	Head amplifier ground
EHC	MAIN	UP-0397	7/19	ECG head amplifier analog ground
EP	MAIN	UP-0397	7/19	Head amplifier digital ground
ER	MAIN	UP-0397	7/19	Respiration signal analog ground
ER	RESP	UP-0519	1/1	- ditto -
ESND	MAIN	UP-0397	16/19	Sound signal ground
	CRTC	UP-0398	14/14	- ditto -
EXTVIDEO	CRTC	UP-0398	4/14	External video output
EXTIN	PIO	UP-0401	3/4	External input signal

Signal	PC board	Model	Page	Description
EXVID	MAIN	UP-0397	5/19	External video switch signal
	CRTC	UP-0398	1/14	- ditto -
FA0-FA7	CRTC	UP-0398	7/14	Graphic frame memory address
FCLK	MAIN	UP-0397	7/19	Clock signal for floating input
FD0-FD31	CRTC	UP-0398	2/14	Graphic frame memory data
G	CRTC	UP-0398	4/14	Slave monitor "GREEN" output (analog)
GA01-GA16	CRTC	UP-0398	1/14	Waveform memory address bus
GUA0-GUA7	CRTC	UP-0398	6/14	Upper screen address
GLA0-GLA7	CRTC	UP-0398	6/14	Lower screen address
GD0-GD15	CRTC	UP-0398	6/14	Wavefrom memory data bus
GND	CRTC	UP-0398	4/14	External input/output ground
GREEN	CRTC	UP-0398	4/14	Slave monitor "GREEN" output (digital)
HA/XJA	MAIN	UP-0397	8/19	Head amplifier-Input box select control
HARST	MAIN	UP-0397	7/19	Reset output for head amlifiers
HI-CUT	MAIN	UP-0397	10/19	High cut filter control signal
HTSND	MAIN	UP-0397	16/19	Heart beat sync. tone source
HTSNDSL0	MAIN	UP-0397	5/19	Heart beat sync. tone selection singal-0
HTSNDSL1	MAIN	UP-0397	5/19	Heart beat sync. tone selection singal-1
HTSNDSL2	MAIN	UP-0397	5/19	Heart beat sync. tone selection singal-2
HTSNDST	MAIN	UP-0397	5/19	Heart beat sync. tone generation control
HTVOL	MAIN	UP-0397	17/19	Heart beat sync. tone singal
HUM	MAIN	UP-0397	11/19	Hum (AC) filter control signal
HW(AD)1	MAIN	UP-0397	10/19	CH1 ECG waveform for AD input (peak-hold)
HW(AD)2	MAIN	UP-0397	10/19	CH2 ECG waveform for AD input (peak-hold)
HW	PIO	UP-0401	3/4	Real time ECG waveform
HW1	MAIN	UP-0397	9/19	ECG2 waveform (1V/mV)
HW1	WSIF	UP-0402	1/3	Real tiem ECG1 output (1V/mV)
HW2	MAIN	UP-0397	9/19	ECG2 waveform (1V/mV)
HW2	WSIF	UP-0402	1/3	Real tiem ECG2 output (1V/mV)
HWOUT	MAIN	UP-0397	10/19	ECG output
W	CRTC	UP-0398	4/14	Slave monitor "WHITE" output (digital)
IBECG	PIO	UP-0401	2/4	Interbed ECG waveform
IBHW	MAIN	UP-0397	11/19	Interbed ECG waveform AD input
IMP	RESP	UP-0519	1/1	Impedance method respiration pickup signal
INST1	MAIN	UP-0397	11/19	ECG1 INST (instantaneous stop) control signal
INST2	MAIN	UP-0397	11/19	ECG2 INST (instantaneous stop) control signal
INT	WSIF	UP-0402	3/3	WS communication interrupt request signal
INTENS	MAIN	UP-0397	19/19	Screen intensity (brightness) control signal
	CRTC	UP-0398	1/14	- ditto -
IO0-IO7	WSIF	UP-0402	2/3	WS communication data 0-7
JACLK	MAIN	UP-0397	7/19	Head ampl. input/output signal reference clock
JACONT	MAIN	UP-0397	7/19	Head ampl. control signal
JASTS	MAIN	UP-0397	7/19	Head ampl. status input

Signal	PC board	Model	Page	Description
KEY0-KEY6	MAIN	UP-0397	5/19	Key input 0-6
LCK	CRTC	UP-0398	6/14	Inter gate array control signal
LCW.0, 1	CRTC	UP-0398	8/14	Shift register load signal 0 and 1
M0-M7	CRTC	UP-0398	2/14	ACRTC local bus
MDW	PIO	UP-0401	3/4	Delayed ECG waveform
	WSIF	UP-0402	1/3	- ditto -
OUT1, OUT2	MAIN	UP-0397	8/19	Head ampl. control signal (spare)
P1W	PIO	UP-0401	3/4	BP1 waveform output
	WSIF	UP-0402	1/3	- ditto -
P2W	PIO	UP-0401	3/4	BP2 waveform output
	WSIF	UP-0402	1/3	- ditto -
PAR1	MAIN	UP-0397	7/19	Resp. head ampl. detection signal
PAR2	MAIN	UP-0397	7/19	2nd slot head ampl. detection signal
PAR3	MAIN	UP-0397	7/19	3rd slot head ampl. detection signal
PAR4	MAIN	UP-0397	7/19	4th slot head ampl. detection signal
PARA	MAIN	UP-0397	7/19	Head ampl. detection signal mixed output
PARA	RESP	UP-0519	1/1	Resp. head ampl. detection signal
PHRST	MAIN	UP-0397	10/19	Peak-hold reset control signal
PUMP+	CRTC	UP-0398	14/14	NIBP pump power (+)
PUMP-	CRTC	UP-0398	14/14	NIBP pump power (-)
PWDWN	MAIN	UP-0397	1/19	Power down signal
R	CRTC	UP-0398	4/14	Slave monitor "RED" output (analog)
R/XB	MAIN	UP-0397	5/19	EEPROM write ready/busy signal
R/XW	MAIN	UP-0397	1/19	Read/Write control signal
	CRTC	UP-0398	1/14	- ditto -
	PIO	UP-0401	1/4	- ditto -
	WSIF	UP-0402	1/3	- ditto -
	ROM-P	UP-0520	1/2	- ditto -
RAS	CRTC	UP-0398	7/14	Row address strobe signal (frame memory)
RCLK	MAIN	UP-0397	7/19	Respiration signal control reference clock
RCLK	RESP	UP-0519	1/1	Respiration signal detection clock
RDA, RDB	MAIN	UP-0397	9/19	Head ampl. status read signal A and B
RED	CRTC	UP-0398	4/14	Slave monitor "RED" output (digital)
RESP	RESP	UP-0519	1/1	Respiration waveform signal
	MAIN	UP-0397	7/19	Respiration waveform output
RSP(HA)	MAIN	UP-0397	7/19	Respiration waveform input when input box is not used
RSP(JA)	MAIN	UP-0397	7/19	Respiration waveform input from input box
RSPINST	MAIN	UP-0397	7/19	Respiration signal INST control signal
RSPTC	MAIN	UP-0397	11/19	Respiration waveform time constant control
RST	MAIN	UP-0397	1/19	Reset signal
RW	PIO	UP-0401	3/4	Respiration waveform output

Signal	PC board	Model	Page	Description
RW	WSIF	UP-0402	1/3	Respiration waveform output
RXD	CRTC	UP-0398	14/14	NIBP data read signal (NIBP to MAIN board)
SAS	CRTC	UP-0398	6/14	Frame memory serial shift signal
SAS0, SAS1	CRTC	UP-0398	8/14	- ditto -
SCLK	CRTC	UP-0398	6/14	Waveform serial conversion clock signal (wave to dot format)
SIGNAL	PIO	UP-0401	3/4	Central communication data
SIGNALR	PIO	UP-0401	3/4	Return line of SIGNAL
SLEEP	CRTC	UP-0398	1/14	Sleep mode screen control signal
SND	MAIN	UP-0397	5/19	Sound signal output
	CRTC	UP-0398	14/14	- ditto -
SPKR+	CRTC	UP-0398	14/14	Speaker output signal (+)
SPKR-	CRTC	UP-0398	14/14	Speaker output signal (-)
SYNC	MAIN	UP-0397	7/19	Head ampl. control sync. signal
TC	MAIN	UP-0397	11/19	ECG time constant control signal
TEST	MAIN	UP-0397	10/19	Calibration voltage
TKDT	MAIN	UP-0397	5/19	Touch key on detection signal
TKYX	MAIN	UP-0397	14/19	Touch key X-axis output voltage
TKYY	MAIN	UP-0397	14/19	Touch key Y-axis output voltage
TPCLOCK	MAIN	UP-0397	5/19	Clock IC adjustment Test Point
TX+	MAIN	UP-0397	18/19	Touch key exciter voltage, X-axis (+)
TX-	MAIN	UP-0397	18/19	touch key exciter voltage, X-axis (-)
TXD	CRTC	UP-0398	14/14	NIBP data read signal (MAIN board to NIBP)
TY+	MAIN	UP-0397	18/19	Touch key exciter voltage, Y-axis (+)
TY-	MAIN	UP-0397	18/19	Touch key exciter voltage, Y-axis (-)
U1W	MAIN	UP-0397	5/19	2nd slot head ampl. input signal
U1WAD	MAIN	UP-0397	11/19	2nd slot head ampl. waveform AD input
U2W	MAIN	UP-0397	5/19	3rd slot head ampl. input signal
U2WAD	MAIN	UP-0397	11/19	3rd slot head ampl. waveform AD input
U3W	MAIN	UP-0397	5/19	4th slot head ampl. input signal
U3WAD	MAIN	UP-0397	11/19	4th slot head ampl. waveform AD input
VA	CRTC	UP-0398	2/14	Graphic "A" video output
VC	CRTC	UP-0398	2/14	Graphic "C" video output
VCAP	MAIN	UP-0397	2/19	Backup capacitor voltage
VIDEO	CRTC	UP-0398	4/14	Video signal output
VMM	MAIN	UP-0397	1/19	Backup battery voltage
X/XY	MAIN	UP-0397	14/19	Touch key X-axis/Y-axis select control signal
X24M	CRTC	UP-0398	7/14	24MHz clock inverted signal
XRTCINT	MAIN	UP-0397	1/19	Periodic interrupt sigal
XACRTCINT	MAIN	UP-0397	1/19	Graphic drawing data transfer sync. interrupt
XACRTSL	CRTC	UP-0398	1/14	ACRTC select signal
XADINT	MAIN	UP-0397	1/19	AD conversion interrupt
XADP	MAIN	UP-0397	5/19	Input box adaptor detection signal
XADRD	MAIN	UP-0397	2/19	AD conversion data read select signal

Signal	PC board	Model	Page	Description
XADSEL	MAIN	UP-0397	2/19	AD conversion control select/IO select signal
XAE	PIO	UP-0401	3/4	System (machine) alarm signal
XAL	PIO	UP-0401	3/4	Alarm signal output
XAS	MAIN	UP-0397	1/19	Address strobe signal
	CRTC	UP-0398	1/14	- ditto -
	PIO	UP-0401	1/4	- ditto -
	WSIF	UP-0402	1/3	- ditto -
XBG	MAIN	UP-0397	1/19	Bus master switch acknowledge singal
XBGACK	MAIN	UP-0397	1/19	Bus master switch acknoledge confirmation signal
XBPRST	MAIN	UP-0397	5/19	NIBP reset ooutput
	CRTC	UP-0398	14/14	- ditto -
XBR	MAIN	UP-0397	1/19	Bus master request signal
XBUSY	WSIF	UP-0402	1/3	Dual port RAM accessing indication signal
XCAS	CRTC	UP-0398	2/14	Graphic memory column address strobe signal
XCLGSL	WSIF	UP-0402	1/3	Select signal for baud rate generator
XCOMW	WSIF	UP-0402	3/3	WS memory write control input
XCS0	CRTC	UP-0398	5/14	Wavefrom memory chip select signal
XCS1	CRTC	UP-0398	5/14	Waveform memory chip select signal (delayed)
XCS2	CRTC	UP-0398	5/14	Inter gate array control signal
XCSAD	PIO	UP-0401	1/4	AD converter chip select signal
XCSCOM	PIO	UP-0401	1/4	Central communication control chip select signal
XCSIOA	PIO	UP-0401	1/4	Spare input/output A chip select signal
XCSIOB	PIO	UP-0401	1/4	Spare input/output B chip select signal
XCSJ	CRTC	UP-0398	6/14	Inter gate array control signal
XCTS	CRTC	UP-0398	14/14	NIBP reception end signal (NIBP to MAIN board)
	MAIN	UP-0397	5/19	- ditto -
XDADATA	MAIN	UP-0397	2/19	DA converted data output select signal
XDAT	CRTC	UP-0398	6/14	Inter gate array control signal
XDCHG	MAIN	UP-0397	11/19	RAM backup capacitor voltage drop signal
XDISP	CRTC	UP-0398	2/14	Graphic display timing signal
XDMAINT	MAIN	UP-0397	1/19	Waveform display data transfer sync. interrupt
XDTACK	MAIN	UP-0397	1/19	Data transfer acknowledge signal
	PIO	UP-0401	1/4	- ditto -
XDTACK	CRTC	UP-0398	1/14	ACRTC data transfer acknowledge signal
XE2PSL	MAIN	UP-0397	2/19	EEPROM chip select signal
XEBUS	MAIN	UP-0397	2/19	External PC board access sigal
XEINTA	MAIN	UP-0397	2/19	External interrupt acknowledge signal
XEXSYNC	CRTC	UP-0398	2/14	Frame sync. signal
XEXTINT	MAIN	UP-0397	1/19	Optional interrupt (WS com., PC com.)
XXFLSYNC	CRTC	UP-0398	4/14	Frame sync. signal
XFULL	CRTC	UP-0398	4/14	Full intensity (brightness) signal (digital)

Signal	PC board	Model	Page	Description
XGDTACK	CRTC	UP-0398	1/14	Waveform data transfer acknowledge signal
XGIRQ	CRTC	UP-0398	1/14	Graphic display data transfer interrupt request signal
	MAIN	UP-0397	7/19	- ditto -
XGRAMSL	CRTC	UP-0398	1/14	Waveform memory select signal
XHALF	CRTC	UP-0398	4/14	Half intensity signal (digital)
XHARST	MAIN	UP-0397	5/19	Head ampl. reset signal
XHO	PIO	UP-0401	3/4	ECG measure signal
XHS	PIO	UP-0401	3/4	Hand shake signal
XHSR	PIO	UP-0401	3/4	Return line of XHS
XHSYNC	CRTC	UP-0398	4/14	Horizontal sync. signal
XHSYNC2D	CRTC	UP-0398	2/14	Horizontal sync. signal (deleyed)
XHSYNCD	CRTC	UP-0398	2/14	Horizontal sync. signal (deleyed)
XHT	PIO	UP-0401	2/4	Heart beat sync. output signal
XIBSEL	PIO	UP-0401	2/4	Interbed ECG select signal
XIN	WSIF	UP-0402	1/3	Input port select signal
XINTA	MAIN	UP-0397	1/19	Inrerrupt acknowledge signal
XINTA	ROM-P	UP-0520	1/2	- ditto -
XINTR	PIO	UP-0401	3/4	Interrupt request (to central monitor)
XINTRR	PIO	UP-0401	3/4	Return line of XINTR
XIORST	PIO	UP-0401	1/4	System reset for optional PC board
XIPL0,1,2	MAIN	UP-0387	1/19	Interrupt priority level signals
XIRQ	CRTC	UP-0398	1/14	Interrupt request for waveform data transfer
	MAIN	UP-0397	7/19	- ditto -
XJACONT	MAIN	UP-0397	2/19	Head ampl./Input box selct switch control
XLRAS	CRTC	UP-0398	7/14	Lower screen lower address strobe signal (frame memory)
XLDS	MAIN	UP-0397	1/19	Lower byte data strobe signal
	CRTC	UP-0398	1/14	- ditto -
	WSIF	UP-0402	1/3	- ditto -
	ROM-P	UP-0520	1/2	- ditto -
XLME/WE	CRTC	UP-0398	7/14	Lower screen mode set/Write enable signal (frame memory)
XLTR/OE	CRTC	UP-0398	7/14	Lower screen transfer/Output enable signal (frame memory)
XMD0	CRTC	UP-0398	6/14	Inter gate array control signal
XMDC	CRTC	UP-0398	6/14	Inter gate array control signal
XMEMR	WSIF	UP-0402	3/3	WS memory read control input
XNIBPSL	MAIN	UP-0397	2/19	NIBP communication control select signal
XOE	CRTC	UP-0398	2/14	Graphic memory output enable signal
XOEH	CRTC	UP-0398	5/14	Upper byte bus output enable signal
XOEL	CRTC	UP-0398	5/14	Lower byte bus output enable signal
XOGPINT	MAIN	UP-0397	1/19	Interrupt for central communciation

Signal	PC board	Model	Page	Description
XOUT	WSIF	UP-0402	1/3	Output port select signal
XPCINT	WSIF	UP-0402	1/3	Interrupt for PC (Personal Computer) com.
XPCSL	WSIF	UP-0402	1/3	PC communication control select signal
XPDWN	MAIN	UP-0397	1/19	Power down detection signal
XRAM0SL	MAIN	UP-0397	2/19	RAM 0 select signal
XRAM1SL	MAIN	UP-0397	2/19	RAM 1 select signal
XRAM2SL	MAIN	UP-0397	2/19	RAM 2 select signal
XRAM3SL	MAIN	UP-0397	2/19	RAM 3 select signal
XRAMC	WSIF	UP-0402	3/3	WS memory slect signal
XRAS	CRTC	UP-0398	2/14	Graphic memory lower address strobe signal
XRD	PIO	UP-0401	1/4	Read control signal
XRD	WSIF	UP-0402	1/3	- ditto -
XRD	ROM-P	UP-0520	2/2	- ditto -
XRDA	MAIN	UP-0397	2/19	Head ampl. status write port A select singal (leads off, etc)
XRDB	MAIN	UP-0397	2/19	Head ampl. status write port B select singal
XRDIO	MAIN	UP-0397	2/19	Low speed memory (IO) read control signal
XRDL	MAIN	UP-0397	2/19	Lower byte read control signal
	ROM-P	UP-0520	1/2	- ditto -
XRDU	MAIN	UP-0397	2/19	Upper byte read control signal
	ROM-P	UP-0520	1/2	- ditto -
XROM0SL	ROM-P	UP-0520	2/2	ROM 0 select signal
XROM1SL	ROM-P	UP-0520	2/2	ROM 1 select signal
XROM2SL	ROM-P	UP-0520	2/2	ROM 2 select signal
XROMCS	MAIN	UP-0397	2/19	ROM select signal
XRSPOF	MAIN	UP-0397	7/19	Resp. exciter clock off control singal (RESP. OFF opertion)
XRST	MAIN	UP-0397	1/19	System reset signal
	CRTC	UP-0398	1/14	- ditto -
	PIO	UP-0401	1/4	- ditto -
	WSIF	UP-0402	1/3	- ditto -
XRT	PIO	UP-0401	2/4	Resp. sync. output
XRTCINT	MAIN	UP-0397	1/19	1/64 seconds periodic interrupt
XRTCSL	MAIN	UP-0397	2/19	Clock IC select signal
XRTS	CRTC	UP-0398	14/14	NIBP communication resuest output signal (MAIN board to NIBP)
XRTS	MAIN	UP-0397	5/19	- ditto -
XSASINH	CRTC	UP-0398	7/14	Frame memory shift clock inhibit signal
XSDIN	MAIN	UP-0397	5/19	NIBP data receive input (RXD)
XSDOUT	MAIN	UP-0397	5/19	NIBP data transfer output (TXD)
XSE0-XSE7	CRTC	UP-0398	6/14	Frame memory serial select signal
XSLD	CRTC	UP-0398	6/14	Waveform data conversion start signal

Signal	PC board	Model	Page	Description
XSNDRD	MAIN	UP-0397	2/19	Alarm sound address write select signal
XSNDSL	MAIN	UP-0397	2/19	Sound generation control IO select signal
XSWSL	MAIN	UP-0397	2/19	Key signal input port select signal
XTEST	PIO	UP-0401	3/4	Calibration control output
XUCAS	CRTC	UP-0398	7/14	Upper screen column address strobe signal (frame memory)
XUDS	MAIN	UP-0397	1/19	Upper byte data strobe signal
XUDS	CRTC	UP-0398	1/14	- ditto -
XUDS	ROM-P	UP-0520	1/2	- ditto -
XUME/WE	CRTC	UP-0398	7/14	Upper screen mode set/Write enable signal
XURAS	CRTC	UP-0398	7/14	Upper screen lower address strobe signal (frame memory)
XUTR/OE	CRTC	UP-0398	7/14	Upper screen transfer/Output enable signal (frame memory)
XVSYNC	CRTC	UP-0398	2/14	Vertical sync. signal
XWDTIM	MAIN	UP-0397	1/19	Watch dog timer control signal
XWE0-XWE3	CRTC	UP-0398	2/14	Graphic frame memory write signal (1)
XWEH	CRTC	UP-0398	6/14	Wavefrom frame memory write singal (upper byte)
XWEL	CRTC	UP-0398	6/14	Wavefrom frame memory write singal (lower byte)
XWR	PIO	UP-0401	1/4	Write control signal
XWR	WSIF	UP-0402	1/3	- ditto -
XWRA	MAIN	UP-0397	2/19	Head ampl. control output A select signal (1st 16 bits)
XWRB	MAIN	UP-0397	2/19	Head ampl. control output B select singal (2nd 16 bits)
XWRIO	MAIN	UP-0397	2/19	Low speed memory (IO) write control signal
XWRL	MAIN	UP-0397	2/19	Write control signal (lower byte)
XWRU	MAIN	UP-0397	2/19	High speed memory write control signal (upper byte)
XWSINT	WSIF	UP-0402	1/3	Interrupt for WS communication
XWSRET	WSIF	UP-0402	1/3	WS reset output
XWSSL	WSIF	UP-0402	1/3	Select signal for dual port RAM
Z-CLK	RESP	UP-0519	1/1	Resp. zero balance clock (250Hz)

Section 4

4. Circuit description

4.1 General

Physiological signals picked up by the head amplifiers are transfered to the head amplifier interface circuit of the main PC board through the head amplifier mother board inside the head amplifier console. Impedance signal for respiration detection is transferred to the respiration board through the ECG/RESP board isolation transformer and head amplifier mother board. In the respiration board, impedance signal is detected and amplified to obtain respiration waveform.

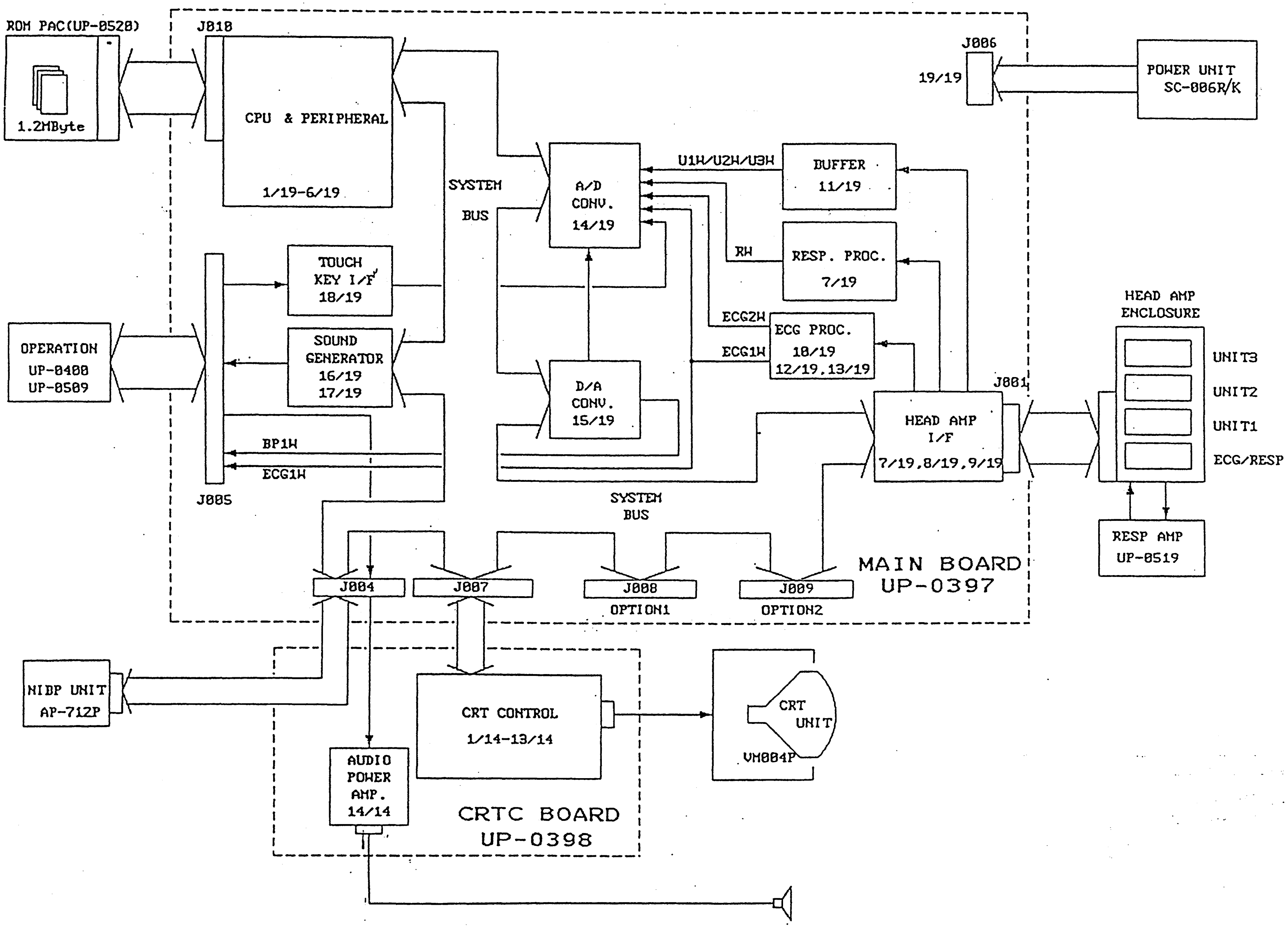
ECG signal is processed in the main board such as pacing pulse rejection, hum filtering etc., and inputted to the A/D conversion circuit. Other signals and touch key signals are buffed or processed with position detection circuit and then A/D converted. At the A/D converter input; offset component from the D/A converter is added to signal to shift zero level of signal for wide dynamic range of A/D convesion. D/A converter outputs BP1 waveform signal to the output terminal on the front of the main unit.

The main PC circuit mounts CPU and its peripheral family devices (ROM, RAM, and I/O devices) and controls all functions of the bedside monitor. The control program (software) is stored in the ROM pack. Therefore, software upgrade is easily made only by replacing the ROM pack.

The sound board generates QRS synchronized tone, alarm tone, and key touch click tone. Audio power amplifier on the CRTC board amplifies tone signal to drive a speaker.

The CRTC board receives graphic data (characters and trendgraph), waveform data from the main board and generates video signal to the CRT unit and external display monitor. NIBP unit is connected to the main unit via the CRTC board.

NIBP unit has all the functions for NIBP measurement and outputs NIBP data to the CPU by communication.


ROM PAC(UP-0520)
1.2MByte
J010
CPU & PERIPHERAL
1/19-6/19
SYSTEM
BUS
A/D
CONV.
14/19
U1W/U2W/U3W
BUFFER
11/19
RW
RESP. PROC.
7/19
ECG2W
ECG1W
ECG PROC.
10/19
12/19,13/19
J006
19/19
POWER UNIT
SC-006R/K
TOUCH
KEY I/F
18/19
SOUND
GENERATOR
16/19
17/19
OPERATION
UP-0400
UP-0509
BP1W
ECG1W
J005
D/A
CONV.
15/19
HEAD AMP
I/F
7/19,8/19,9/19
J001
HEAD AMP
ENCLOSURE
UNIT3
UNIT2
UNIT1
ECG/RESP
RESP AMP
UP-0519
SYSTEM
BUS
J004
J007
J008
OPTION1
J009
OPTION2
MAIN BOARD
UP-0397
NIBP UNIT
AP-712P
CRT CONTROL
1/14-13/14
CRT
UNIT
VM004P
AUDIO
POWER
AMP.
14/14
CRTC BOARD
UP-0398

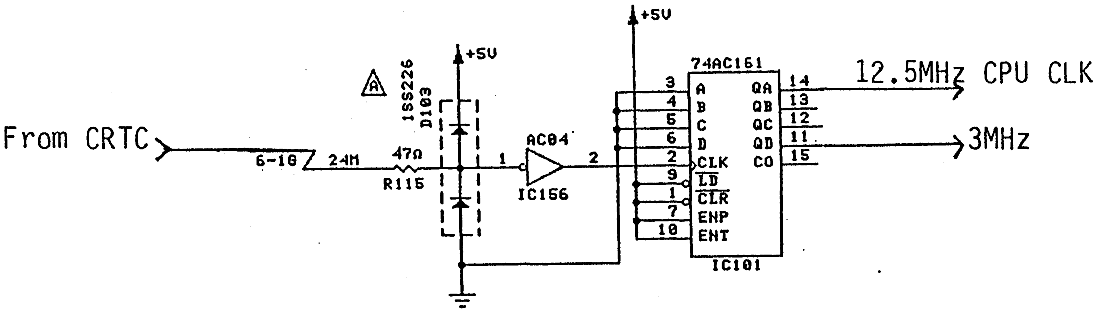
4.2 Functions of each component

4.2.1 Main board UP-0397

The main board is the central unit of the system and functions except for CRT display related items are made by this unit.

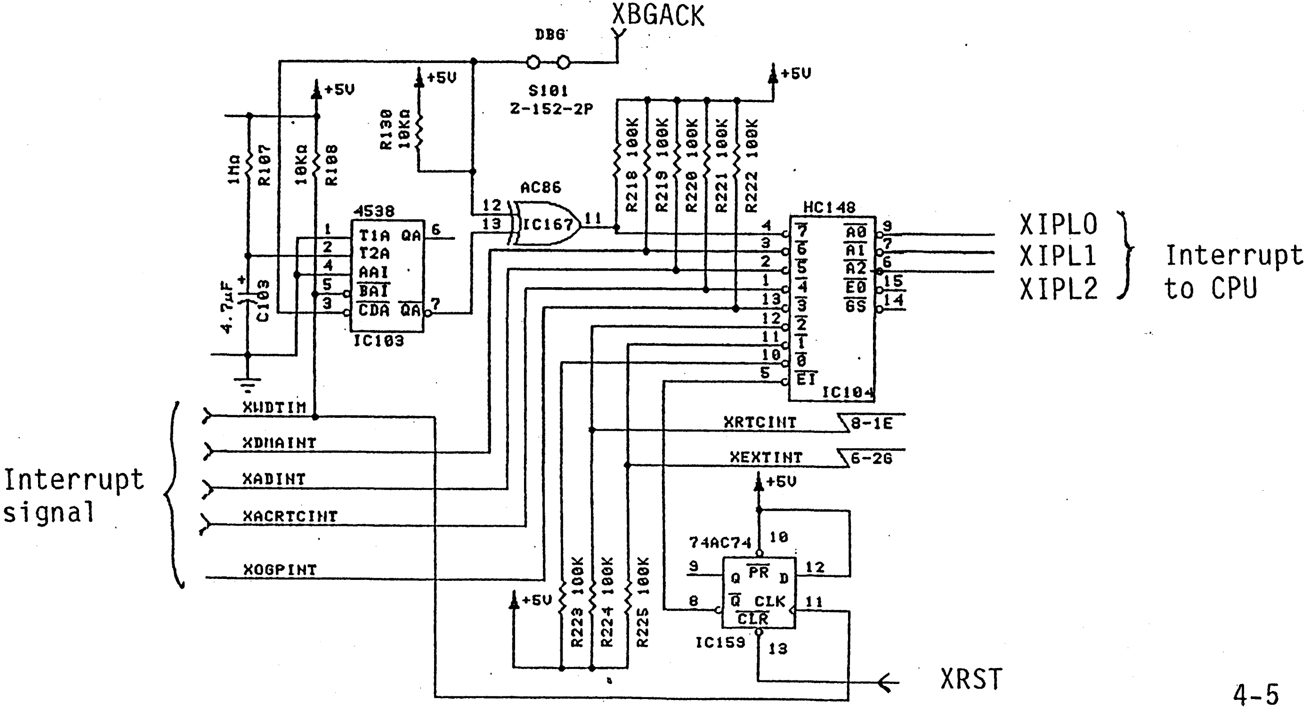
1) CPU and peripherals

CPU device employed in the system is the MC68000 (HD68HC000) of version 12.5MHz. CPU clock is 12.288MHz which is half division of system clock supplied from the CRTC board. From this system clock signal, other clock signals 3M, 768K, 384K, 19.2K, etc., to be used in the main board are generated.



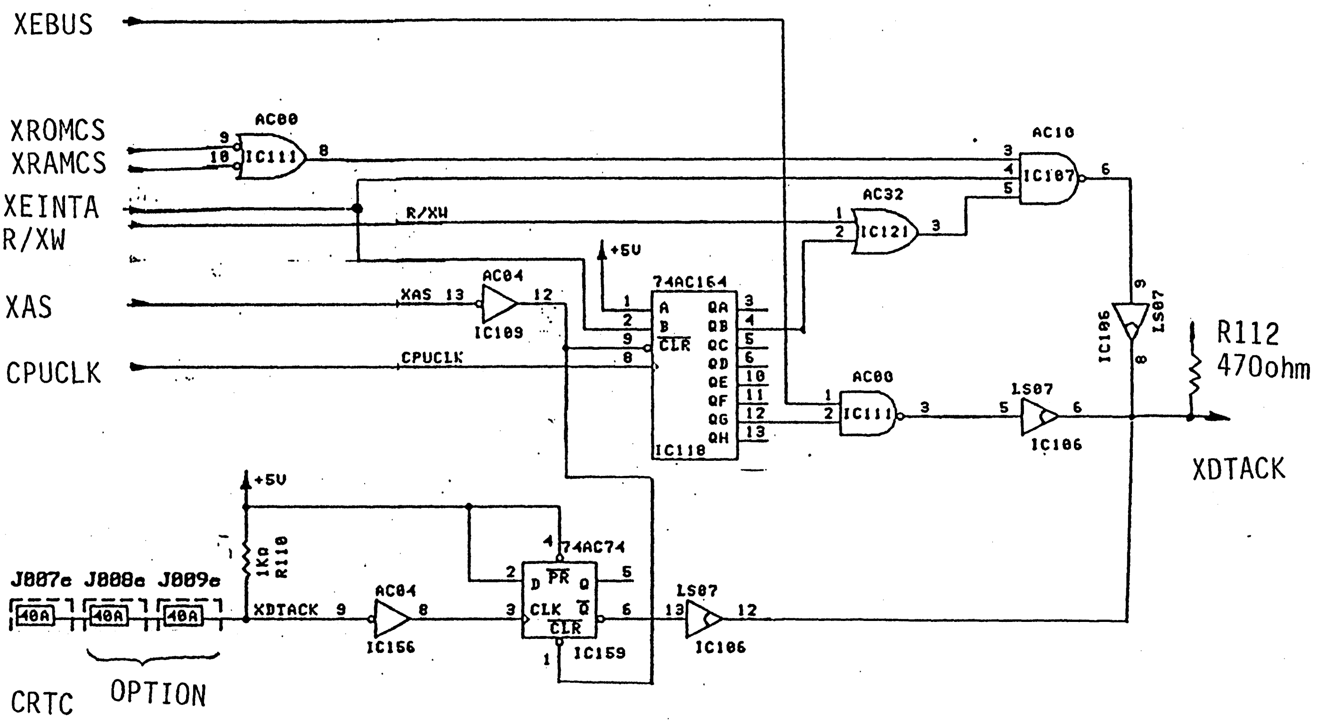
From CRTC
6-18
24M
47Ω
R115
1SS226
D103
+5V
AC04
1
2
IC156
+5V
74AC161
3 A
4 B
5 C
6 D
2 CLK
9 LD
1 CLR
7 ENP
10 ENT
QA 14
QB 13
QC 12
QD 11
CO 15
IC101
12.5MHz CPU CLK
3MHz

IC103 is an one-shot multi-vibrator for watch dog timer circuit. Time constant of this one-shot circuit is set to approximately 5 seconds by R107 and C103. If there is no reset in 5 seconds, highest priority interrupt is sent to the CPU to inform software runaway. IC159 inhibits all interrupts to the CPU at power on or power restoration after short time power down to prevent operation error of the system. IC104 determines priority of interrupt and order of priority is form 7, 6, 5, and 1. In normal operating condition, all interrupts except for watch dog timer interrupt are used. Interrupt signal is sent to the CPU via the IPL0- IPL2 3 bit lines in order of interrupt priority.



XBGACK
DBG
S101
Z-152-2P
+5V
1MΩ R107
10kΩ R108
R130 10kΩ
4.7µF C103
4538
T1A QA
T2A
AAI
BAI
CDA QA
IC103
AC86
IC167
R218 100K
R219 100K
R220 100K
R221 100K
R222 100K
HC148
A0
A1
A2
E0
GS
EI
IC104
XIPL0
XIPL1
XIPL2
Interrupt to CPU
XRTCINT 8-1E
XEXTINT 6-26
Interrupt signal
XWDTIM
XDMAINT
XADINT
XACRTCINT
XOGPINT
R223 100K
R224 100K
R225 100K
74AC74
PR
D
CLK
CLR
IC159
XRST

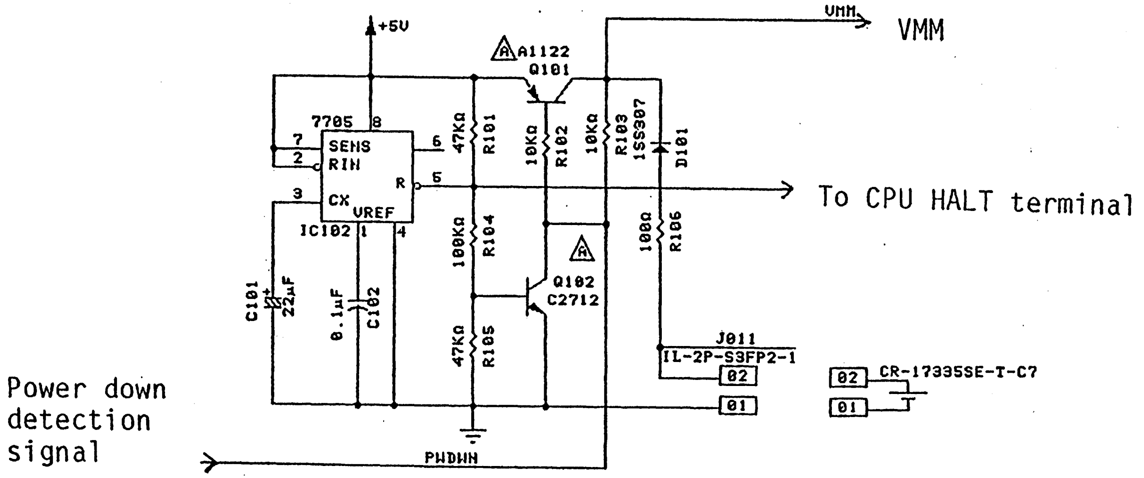
XDTACK signal is returned to the CPU by the peripheral devices in response to chip select signal. As access time of each device is different, system ROM an RAM respond without delay time at read cycle, and 1 clock (approx. 80ns) delayed at write cycle, and other IC chips on the main board respond 6 clocks delayed. Response signals from the CRTC board, central interface or WS interface is synchronized with XAS signal by the IC159.



XEBUS
XROMCS
XRAMCS
XEINTA
R/XW
XAS
CPUCLK
AC00
IC111
AC10
IC107
AC32
IC121
R/XW
+5V
AC04
XAS 13
IC109
74AC164
A QA
B QB
CLK QC
QD
QE
QF
QG
QH
IC118
CPUCLK
AC00
IC111
LS07
IC106
R112
470ohm
XDTACK
+5V
1KΩ
R118
J007e J008e J009e
40A
XDTACK
AC04
IC156
74AC74
PR
D Q
CLK Q̄
CLR
IC159
LS07
IC106
CRTC
OPTION

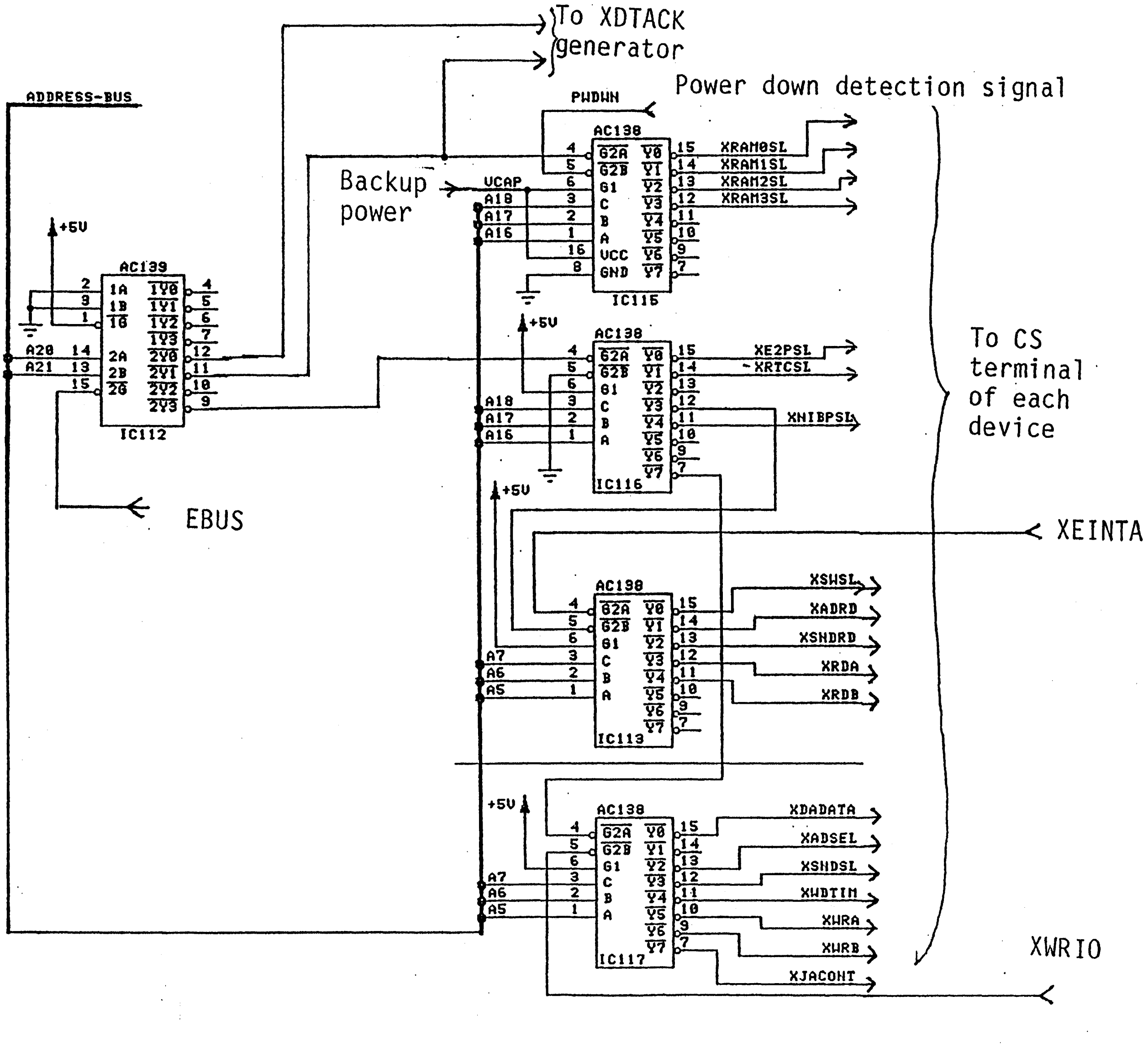
CPU waits the response signal and stops operation if there is no response. Bus error detection is informed to the CPU if there is not response within a specified time which means malfunction of peripheral devices. In this system bus error detection time is 20us from start of XAS signal.

At power on, power on reset signal is generated by the IC102. Reset signal is released approximately 200ms after +5V power voltage exceeds a specified threshold voltage. 200ms delay time is determined by capacitance of the C102.
When +5V power voltage drops, reset signal is generated to prevent operation malfunction of the CPU and other devices.



+5V
VMM
VMM
A1122
Q101
7705
SENS
RIN
CX
VREF
R
IC102
47KΩ R101
10KΩ R102
10KΩ R103
1SS307 D101
To CPU HALT terminal
100KΩ R104
100Ω R106
Q102
C2712
C101 22μF
0.1μF C102
47KΩ R105
J011
IL-2P-S3FP2-1
02
01
CR-17335SE-T-C7
Power down detection signal
PWDWN

Chip select circuit selects a device for read/write access by the CPU and IC112, IC113, IC115- IC117 are assigned according to memory map and I/O map. In the IC devices, IC115 only is power backed up by power backup capacitor for trend data and other data storage in the RAM while power is off.

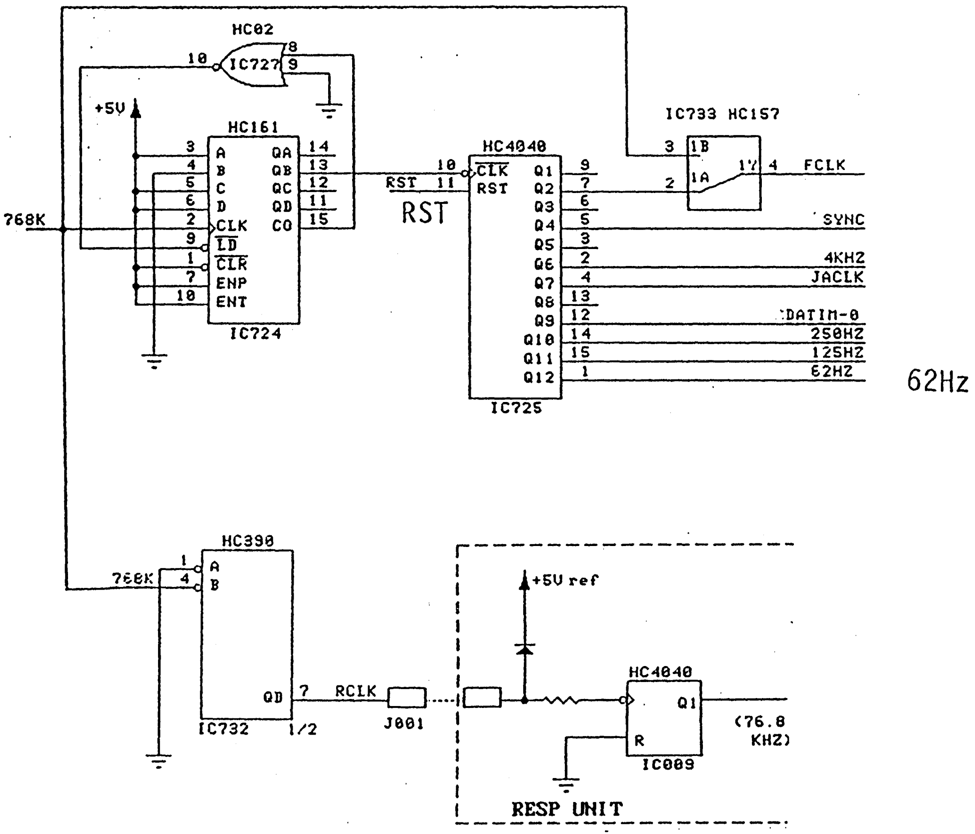


To XDTACK generator
ADDRESS-BUS
PWDWN
Power down detection signal
Backup power
VCAP
AC138
G2A G2B G1 C B A VCC GND
Y0 Y1 Y2 Y3 Y4 Y5 Y6 Y7
XRAM0SL
XRAM1SL
XRAM2SL
XRAM3SL
IC115
A18
A17
A16
+5V
AC139
1A 1B 1G 2A 2B 2G
1Y0 1Y1 1Y2 1Y3 2Y0 2Y1 2Y2 2Y3
A20
A21
IC112
EBUS
XE2PSL
XRTCSL
XNIBPSL
IC116
To CS terminal of each device
XEINTA
XSWSL
XADRD
XSWDRD
XRDA
XRDB
A7
A6
A5
IC113
XDADATA
XADSEL
XSWDSL
XWDTIM
XWRA
XWRB
XJACONT
IC117
XWRIO

2) Input interface circuit

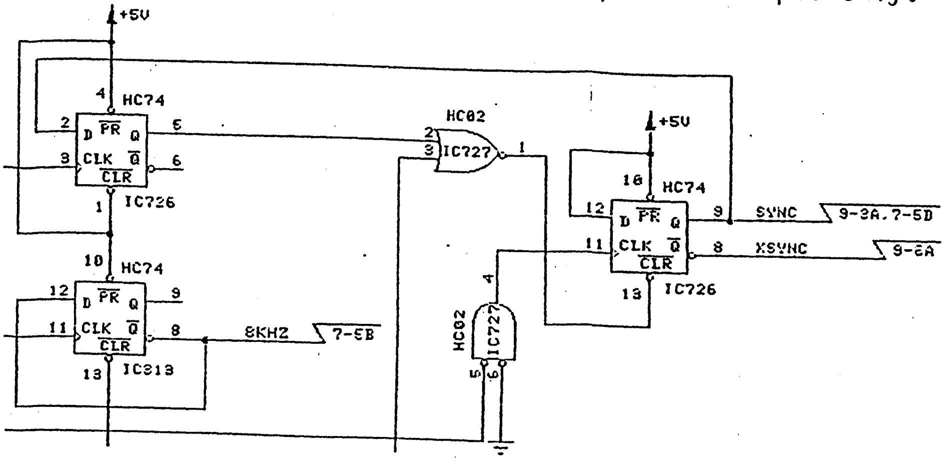
Waveform signals (analog signals) such as ECG waveform, head amplifier status signals from the mother board and control signals for head amplifiers pass through this input interface circuit.

768K clock signal from the CPU is divided to generate clock signals for this circuit block. IC724 divides the clock signal to 1/3 and IC725 divides the clock again to finally obtain 62.5Hz signal for switching PARA signals. IC733 changes frequency of clock signal when head amplifiers are inserted in the main unit console or in an extension input box (under development).



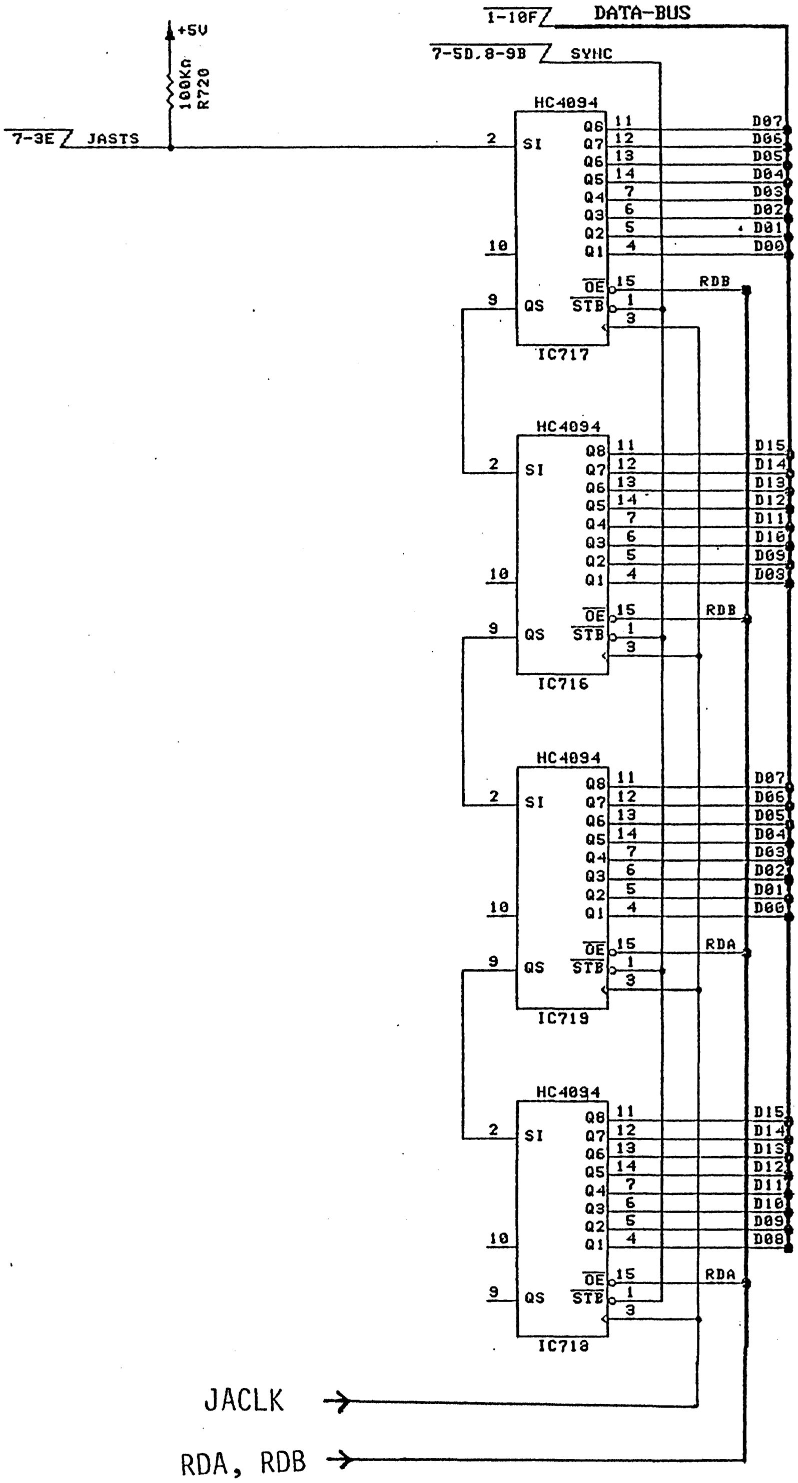
HC02
IC727
10
8
9
+5V
HC161
IC724
A
B
C
D
CLK
LD
CLR
ENP
ENT
QA
QB
QC
QD
CO
768K
HC4040
IC725
CLK
RST
RST
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
Q12
IC733 HC157
1B
1A
1Y
FCLK
SYNC
4KHZ
JACLK
DATIN-0
250HZ
125HZ
62HZ
62Hz
HC390
IC732
1/2
768K
A
B
QD
RCLK
J001
+5V ref
HC4040
IC009
Q1
R
(76.8 KHZ)
RESP UNIT

Head amplifiers synchronize timing for communication with the main unit with SYNC signal. SYNC signal is a pulse signal generated every 16ms and between SYNC signal and next SYNC signal, JACONT 32 bit control signal is sent from the main unit and JASTS 32 bit status signal is sent from the head amplifiers repeatedly.



+5V
HC74
IC726
D
PR
Q
CLK
CLR
HC74
IC313
8KHZ
7-6B
HC02
IC727
+5V
HC74
IC726
SYNC
9-3A.7-5D
XSYNC
9-3A
HC02
IC727

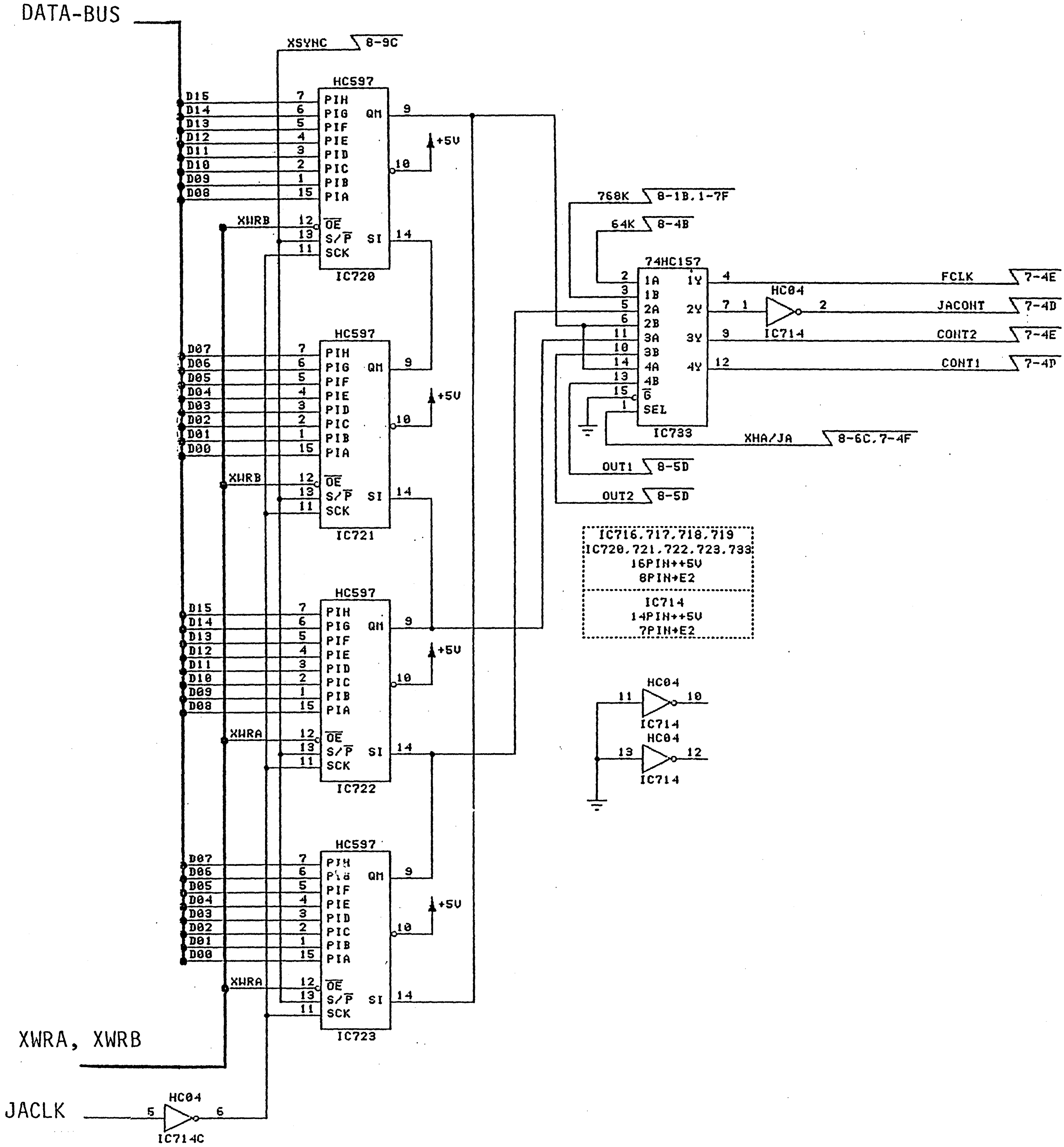
JASTS status signal is inputted to a shift register which is strobed with each SYNC pulse and read out by the access from the CPU.



1-10F DATA-BUS
7-5D,8-9B SYNC
+5V
100KΩ R720
7-3E JASTS
HC4094
IC717
IC716
IC719
IC718
SI
QS
Q8
Q7
Q6
Q5
Q4
Q3
Q2
Q1
OE
STB
D07
D06
D05
D04
D03
D02
D01
D00
D15
D14
D13
D12
D11
D10
D09
D08
RDB
RDA
JACLK
RDA, RDB

IC720- IC723 send control signals to the head amplifiers and IC716-IC719 receive status signal. Data written by the CPU is parallel-serial converted and sent to the head amplifiers via IC733, IC714 and IC703.

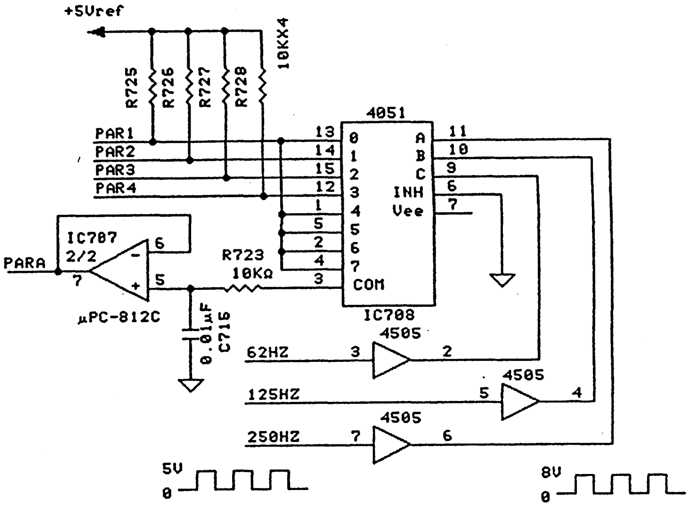
As timing of control signal of each head amplifier is different, CONT1 and CONT2 signals are also sent on the way of shift register to the head amplifiers.


DATA-BUS
XSYNC
8-9C
HC597
D15
D14
D13
D12
D11
D10
D09
D08
7
6
5
4
3
2
1
15
PIH
PIG
PIF
PIE
PID
PIC
PIB
PIA
QH
9
10
+5V
XWRB
12
13
11
OE
S/P
SCK
SI
14
IC720
HC597
D07
D06
D05
D04
D03
D02
D01
D00
XWRB
IC721
HC597
D15
D14
D13
D12
D11
D10
D09
D08
XWRA
IC722
HC597
D07
D06
D05
D04
D03
D02
D01
D00
XWRA
IC723
XWRA, XWRB
JACLK
5
HC04
6
IC714C
768K
8-1B.1-7F
64K
8-4B
74HC157
2
3
5
6
11
10
14
13
15
1
1A
1B
2A
2B
3A
3B
4A
4B
G
SEL
1Y
2Y
3Y
4Y
4
7
9
12
IC733
HC04
1
2
IC714
FCLK
7-4E
JACONT
7-4D
CONT2
7-4E
CONT1
7-4D
XHA/JA
8-6C.7-4F
OUT1
8-5D
OUT2
8-5D
IC716.717.718.719
IC720.721.722.723.733
16PIN++5V
8PIN+E2
IC714
14PIN++5V
7PIN+E2
HC04
11
10
IC714
HC04
13
12
IC714

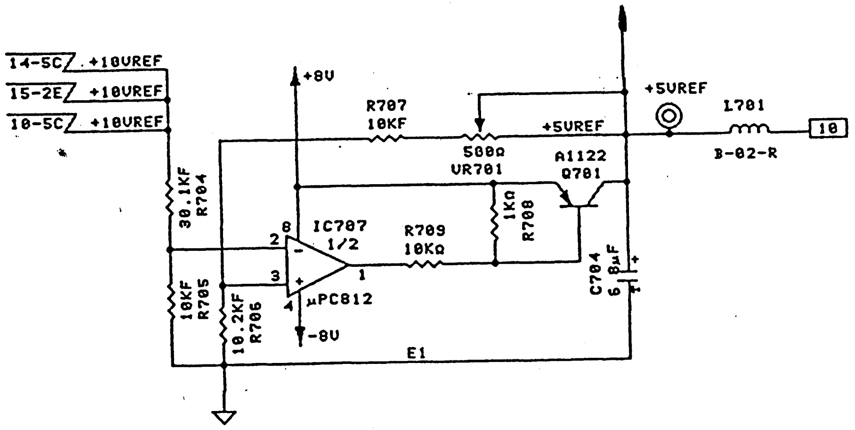
There are PAR1 to PAR4 signals in addition to the status signal from the head amplifiers that indicate which head amplifiers are inserted into the head amplifier slots.

Resistor of different resistance value is connected across this PARA signal line and ground in each head amplifier. Attenuated voltage of +5Vref by this resistor indicates each head amplifier. IC708 switches PAR1 to PAR4 signals one by one and sends them to the next block as PARA signal. IC707 and Q701 generate +5Vref reference voltage.

PAR1 is measure signal of the ECG/RESP head amplifier and PAR1 is 0V during respiration measurement.


+5Vref
R725
R726
R727
R728
10KX4
PAR1
PAR2
PAR3
PAR4
4051
13
14
15
12
1
5
2
4
3
0
1
2
3
4
5
6
7
COM
A
B
C
INH
Vee
11
10
9
6
7
IC707
2/2
6
7
5
PARA
µPC-812C
R723
10KΩ
0.01µF
C716
IC708
4505
62HZ
3
2
4505
125HZ
5
4
4505
250HZ
7
6
5V
0
8V
0

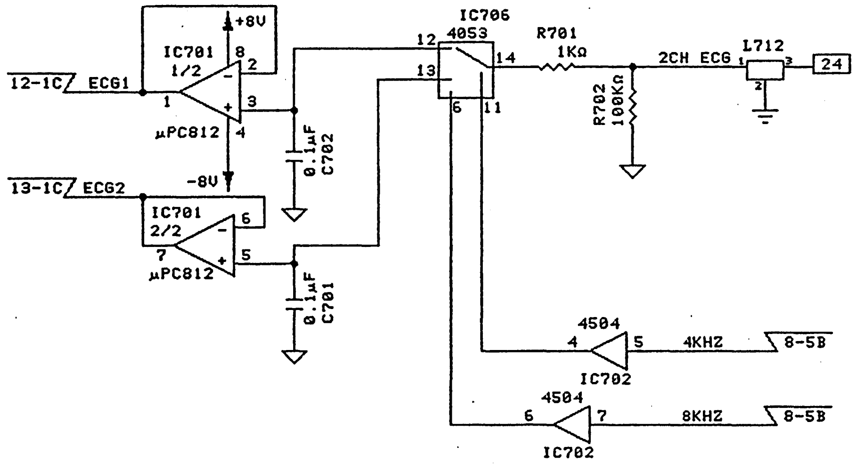
+5VREF

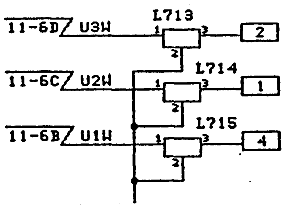

14-5C
+10VREF
15-2E
+10VREF
10-5C
+10VREF
+8V
R707
10KF
500Ω
VR701
+5VREF
+5VREF
L701
B-02-R
10
A1122
Q701
30.1KF
R704
IC707
1/2
8
2
3
1
4
µPC812
R709
10KΩ
1KΩ
R708
C704
6.8µF
10KF
R705
10.2KF
R706
-8V
E1

Waveform data is sent from each head amplifier on analog lines U1W- U3W (Unit 1; above the ECG/RESP head amplifier, Unit 3; top slot).

Slot	Slot name	Signal name	PARA name (parameter name)
	Unit 3	U3W	PAR4
	Unit 2	U2W	PAR3
	Unit 1	U1W	PAR2
○	ECG/RESP	2ch ECG/Resp	PAR1

Multiplexed waveform data of some head amplifiers are demodulated with software after A/D conversion. As high speed ECG waveform data demodulation processing is overload for software, IC706 is used to demodulate ECG1 and ECG2 waveforms from 2CHECG signal.

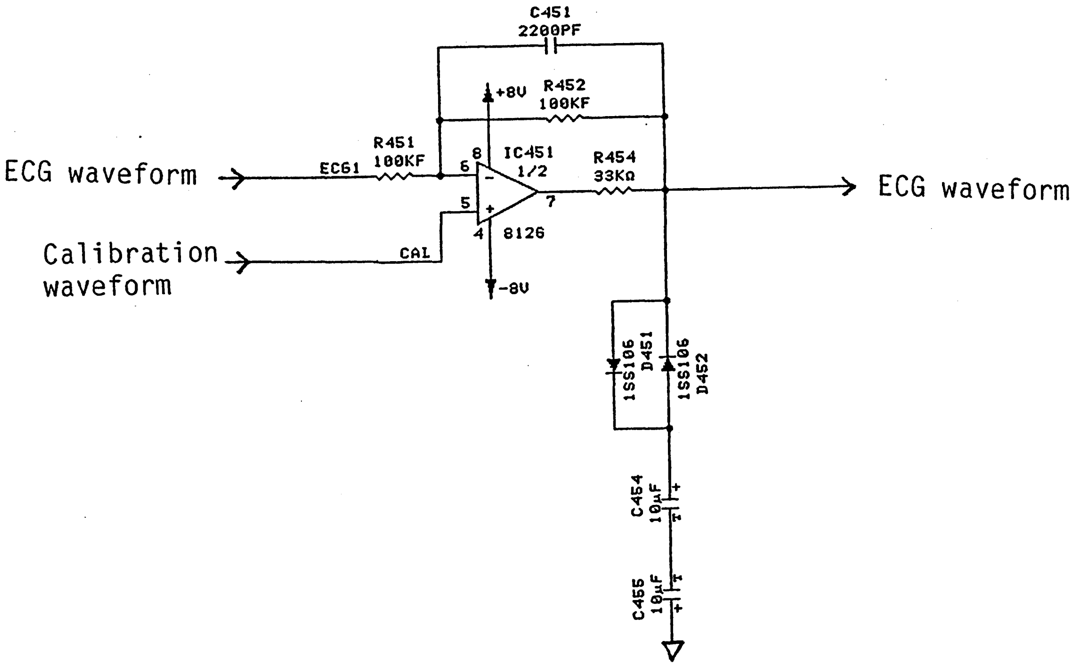

+8V
IC701 1/2
8
2
3
1
4
μPC812
12-1C ECG1
-8V
13-1C ECG2
IC701 2/2
6
7
5
μPC812
0.1μF C702
0.1μF C701
IC706 4053
12
13
14
6
11
R701 1KΩ
R702 100KΩ
2CH ECG
L712
1
3
2
24
4504
4
5
4KHZ
8-5B
IC702
4504
6
7
8KHZ
8-5B
IC702


11-6D U3W
L713
2
11-6C U2W
L714
1
11-6B U1W
L715
4

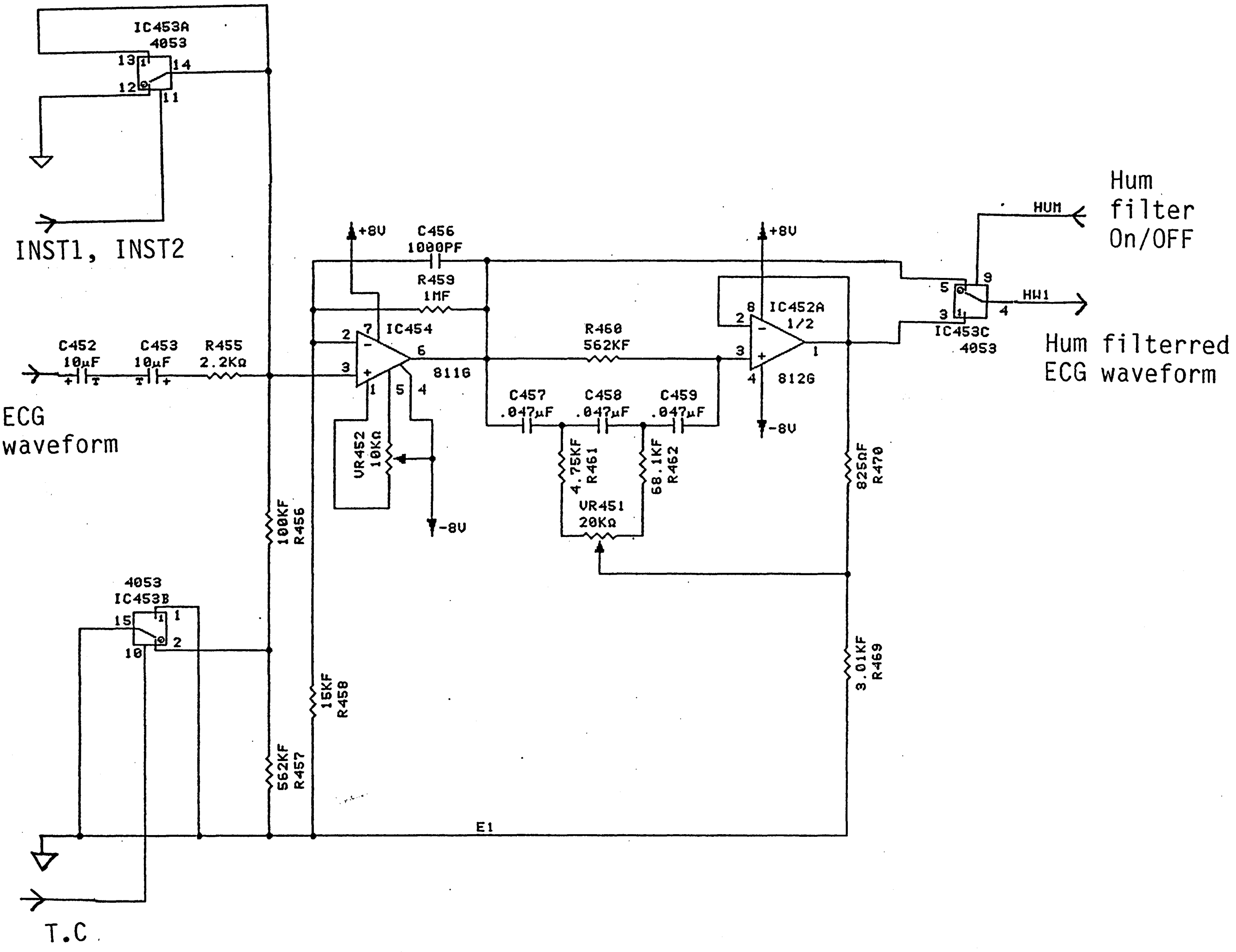
3) ECG processing circuit block

ECG1 and ECG2 signals are independently processed. Descriptions are for ECG1 in this manual and part symbol numbers in parentheses ( ) indicate for ECG2.

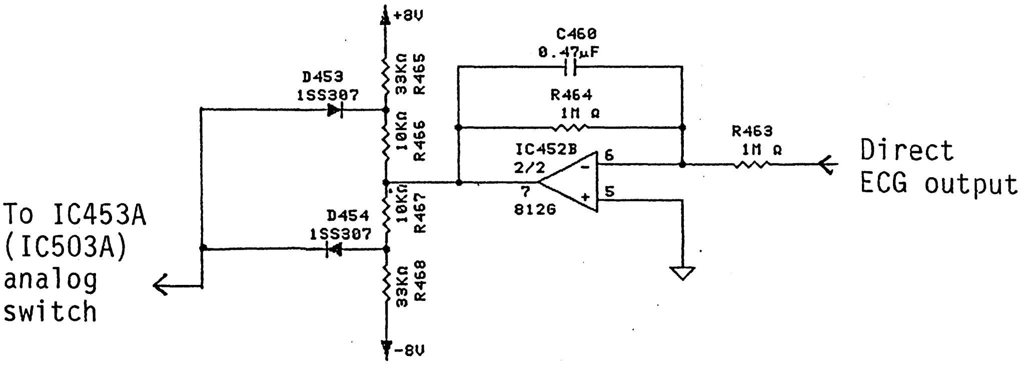
ECG signal from the head amplifier is inputted to the IC451 1/2 (IC451 2/2) in 15mV/1mV signal level. Calibration signal is superimposed to ECG signal and the IC451 functions as a buffer amplifier and pacing pulse limitter. D451 and D542 (D501 and D502) are clamp diodes against over input. C454, C455 (C504, C505) and R454 (R504) are composing of large time constant circuit. With this time constant, slow change (Ex. base line drift) or small signal which does not exceeds forward direction voltage of the clamp diodes directly passes through the circuit but high speed large amplitude pacing pulses are clamped with the diodes to limit output level so as to prevent saturation in the next circuit.


ECG waveform
Calibration waveform
ECG1
CAL
R451
100KF
C451
2200PF
+8V
R452
100KF
IC451
1/2
8
6
5
4
7
8126
-8V
R454
33KΩ
ECG waveform
1SS106
D451
1SS106
D452
C454
10μF
C455
10μF
+
+

ECG amplifier time constant is determined by C452, C453 (C502, C503), R456 and R457 (R506 and R507). Analog switch IC453B (IC503B) selects 0.5 seconds or 3.2 seconds . ECG signal is 67 times amplified to be 1V/1mV level signal. Analog switch IC453C (IC503C) selects direct ECG output or AC interference filtered ECG output by IC452A (IC502A). This AC interference filter is a notch filter of 54Hz null point. Reduction ratio is -20dB for both 50Hz and 60Hz line frequencies with high cut filter in later circuit.

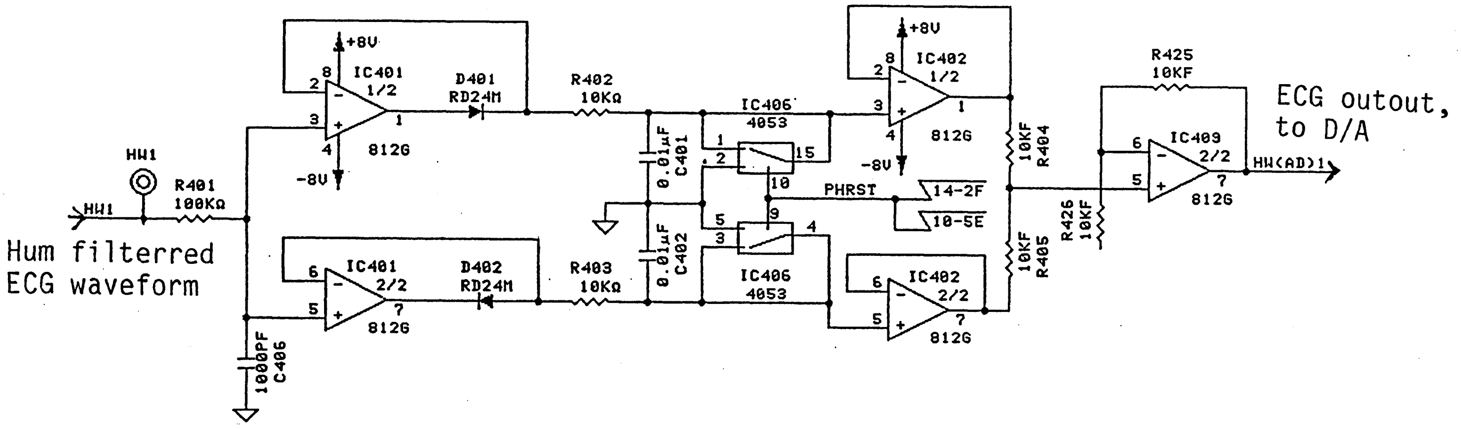

IC453A
4053
13
14
12
11
INST1, INST2
+8V
C456
1000PF
R459
1MF
IC454
8116
C452
10µF
C453
10µF
R455
2.2KΩ
ECG waveform
VR452
10KΩ
-8V
R460
562KF
C457
.047µF
C458
.047µF
C459
.047µF
R461
4.75KF
R462
68.1KF
VR451
20KΩ
+8V
IC452A
1/2
8126
-8V
R470
825ΩF
R469
3.01KF
HUM
Hum filter On/OFF
HW1
IC453C
4053
Hum filterred ECG waveform
R456
100KF
R458
15KF
R457
562KF
4053
IC453B
15
10
1
2
E1
T.C.

Next stage of circuit is auto INST (instantaneous stop) circuit composed of IC452B (IC502B). When ECG baseline drifts, lower frequency component in ECG signal is amplified and applied to resistor network composed of R465- R468 (R515-R518). Output of IC452B (IC502B) is normally near 0V and D453 and D454 (D503 and D504) are off condition. When ECG baseline drifts, voltage is generated here and when one of the diodes is turned to on due to large drift, C452 and C453 (C504 and C505) are rapidly charged through the diode. As IC452B (IC502B) is an inverting amplifier, output works against baseline drift. Therefore, IC452B (IC502B) output returns to near 0V. IC453A (IC503A) is an analog switch for manual INST (instantaneous stop) of ECG signal.

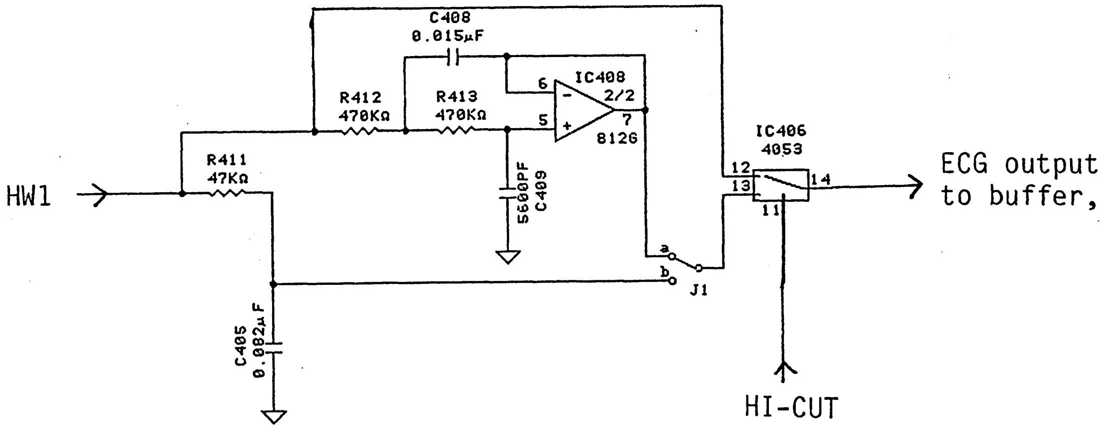

+8V
C460
0.47μF
D453
1SS307
33KΩ R465
R464
1M Ω
10KΩ R466
R463
1M Ω
IC452B
2/2
6
Direct
ECG output
7
5
8126
To IC453A
(IC503A)
analog
switch
D454
1SS307
10KΩ R467
33KΩ R468
-8V

Next stage of circuit is peak hold circuit of ECG signal after R401 and C406 (R406 and C407). To sample sharp pulse such as cardiac pacing pulse by the A/D converter, peak hold circuit is used to hold peak until next sampling time. With this processing, pacing pulse can be displayed on the screen. IC401 1/2, D401, IC402 1/2 (IC403 1/2, IC403, IC404 1/2) are for positive peak from E1 ground and IC401 2/2, D402, IC402 2/2 (IC403 2/2, D404, IC404 2/2) are for negative peak from E1.

C401 and C402 (C403 and C404) are for holding voltage of peak and IC406 1/3 and 2/3 are for discharging peak voltage to reset. R404 and R405 (R409 and R410) add the both polarity peaks and IC409 2/2 (IC405 2/2) bufs and amplifies the peak-held ECG signal to be used for ECG display on the screen.

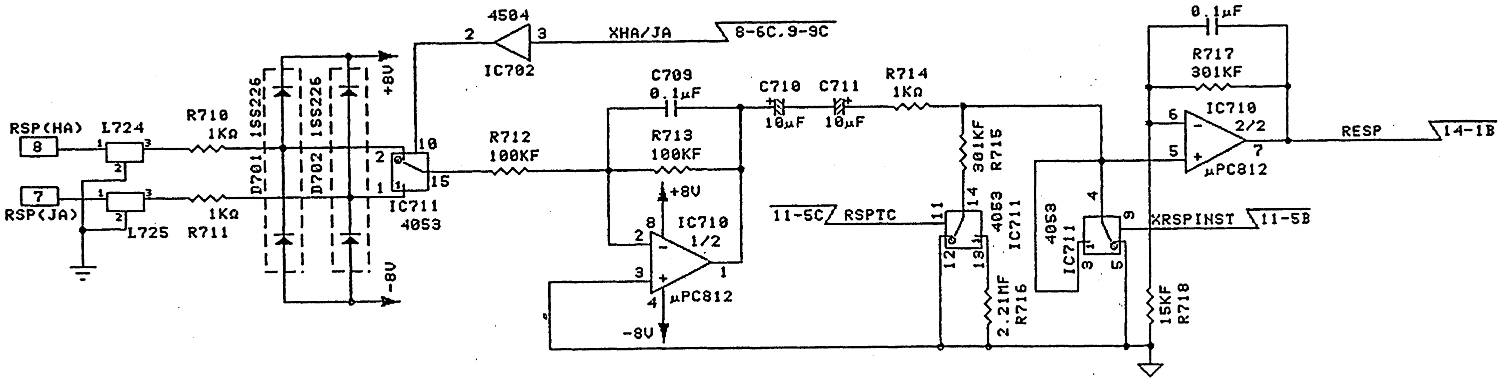

+8V
IC401
1/2
8
2
3
4
1
8126
-8V
D401
RD24M
R402
10KΩ
IC406
4053
0.01μF C401
1
2
15
10
9
5
3
4
PHRST
14-2F
10-5E
+8V
8
IC402
1/2
2
3
1
4
8126
-8V
10KF R404
R425
10KF
ECG outout,
to D/A
6
IC409
2/2
5
7
8126
HW(AD)1
HW1
R401
100KΩ
HW1
Hum filterred
ECG waveform
R426 10KF
IC401
2/2
6
5
7
8126
D402
RD24M
R403
10KΩ
0.01μF C402
IC406
4053
10KF R405
6
IC402
2/2
5
7
8126
1000PF C406

Branched ECG signal before peak hold circuit is directly passes through IC406 3/3 (IC407 3/3) analog switch to central monitor and ECG output on the front panel. The analog switch selects 40Hz high cut filter on or off. Jumper line J1 (J2) is to change ECG high cut filter characteristics. In factory set, point "a" is closed and point "b" is open.


C408
0.015µF
IC408
2/2
8126
R412
470KΩ
R413
470KΩ
6
5
7
R411
47KΩ
HW1
5600PF
C409
IC406
4053
12
13
14
11
ECG output
to buffer,
a
b
J1
C405
0.082µF
HI-CUT

4) Respiration waveform processing circuit block

Respiration waveform head amplifier output RSP(HA) is inputted to buffer amplifier through IC711 analog switch. This switch is used to select signal line to RSP(JA) when extension input box is used with the bedside monitor main unit. C710, C711, R715 and R714 determine respiration amplifier time constant. IC711 2/3 selects 1.5 seconds or 12.5 seconds time constant. IC711 2/3 is for INST (instantaneous stop) of respiration waveform. Output of the time constant circuit, respiration waveform is 21 times amplified by IC710 2/2 to be 1V/1ohm (BSM-8300J/K) signal level. This output level is 0.8V/1ohm in case of BSM-8300A used with AAMI type ECG connection cable in which 1kohm resistors are connected.

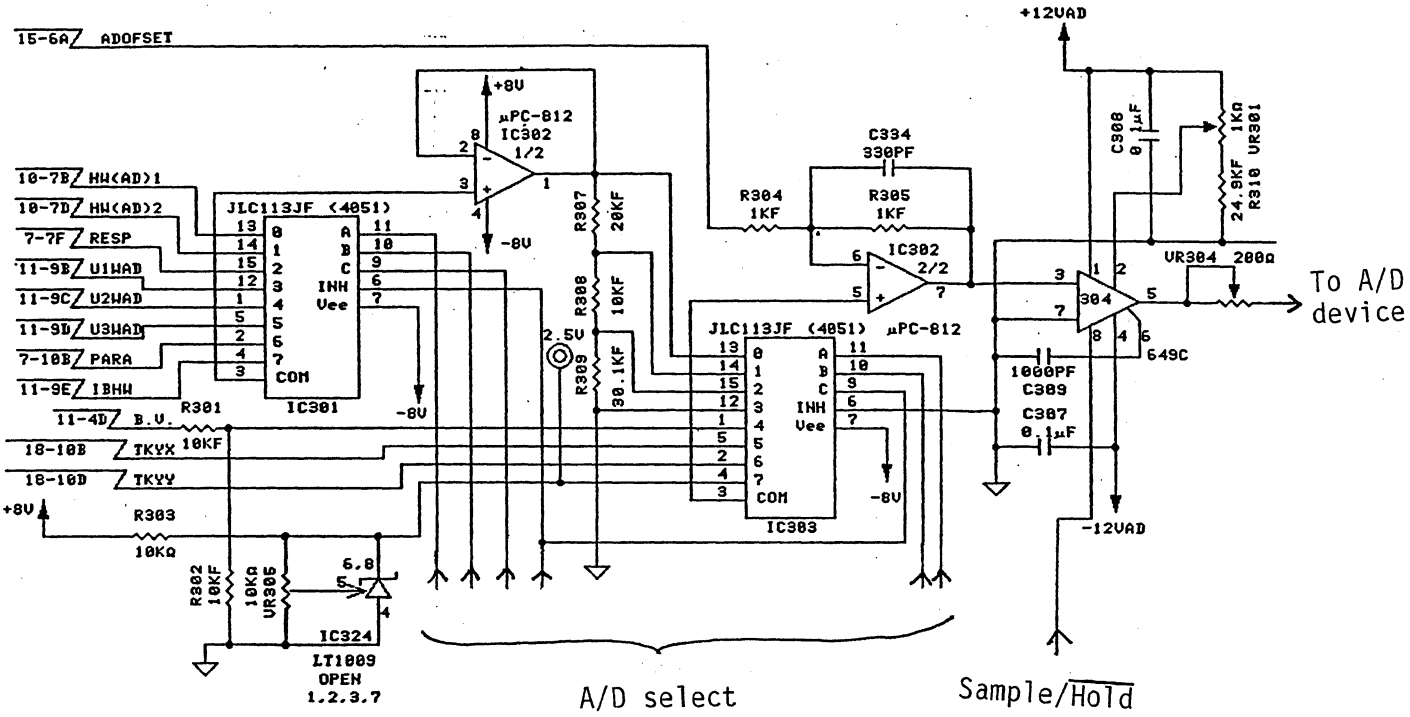

RSP(HA)
8
L724
R710
1KΩ
7
RSP(JA)
L725
1KΩ
R711
1SS226
D701
1SS226
D702
+8V
-8V
4584
IC702
XHA/JA
8-6C.9-9C
IC711
4053
10
15
R712
100KF
C709
0.1µF
R713
100KF
+8V
IC710
1/2
µPC812
-8V
C710
10µF
C711
10µF
R714
1KΩ
301KF
R715
11-5C
RSPTC
4053
IC711
2.21MF
R716
4053
IC711
XRSPINST
11-5B
C712
0.1µF
R717
301KF
IC710
2/2
µPC812
RESP
14-1B
15KF
R718

5) A/D converter

Waveform signals from head amplifiers and PARA (parameter) signal are multiplexed by IC301 and inputted to IC302 1/2. Gain of IC302 1/2 is changed according to signal and its output signal is inputted to IC303. In addition to above data, IC303 multiplexes system status (touch key voltages, battery voltage, etc.) and outputs them to the next circuit block.

IC302 adds offset voltages from the D/A converter to parameters whose signal is not symmetric on 0V such as blood pressure waveforms. With offset voltages, A/D conversion can be made in wide dynamic range.

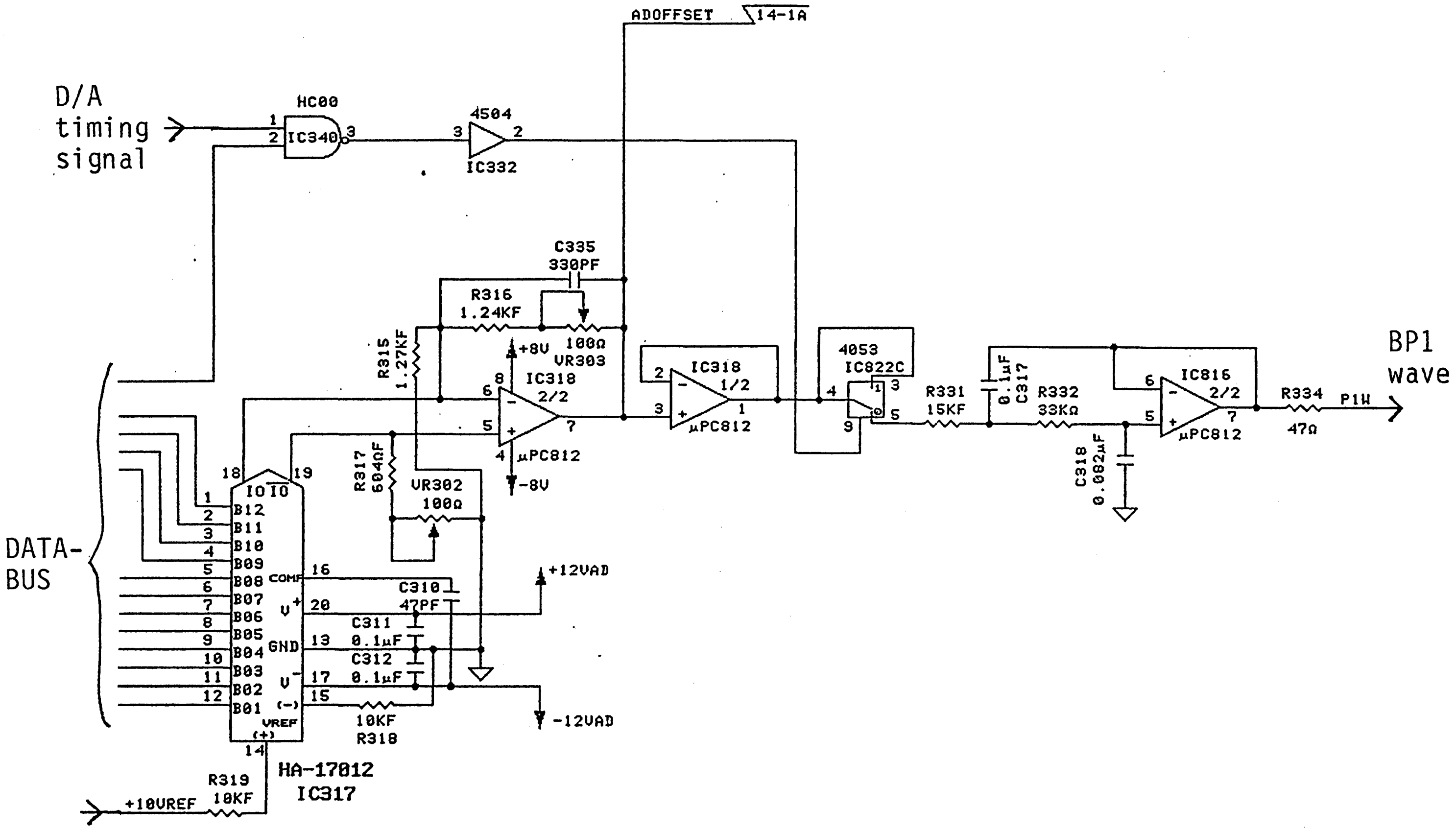
IC304 is a sample hold circuit to hold input voltage during A/D conversion to avoid variation of input.


15-6A ADOFSET
+8V
µPC-812
IC302
1/2
-8V
10-7B HW(AD)1
10-7D HW(AD)2
7-7F RESP
11-9B U1WAD
11-9C U2WAD
11-9D U3WAD
7-10B PARA
11-9E IBHW
11-4D B.V.
R301
10KF
18-10B TKYX
18-10D TKYY
+8V
R303
10KΩ
R302
10KF
10KΩ
VR306
6.8
IC324
LT1009
OPEN
1.2.3.7
JLC113JF (4051)
IC301
COM
INH
Vee
R307
20KF
R308
10KF
R309
30.1KF
2.5V
R304
1KF
C334
330PF
R305
1KF
IC302
2/2
JLC113JF (4051)
µPC-812
IC303
+12VAD
C308
0.1µF
24.9KF
R310
1KΩ
VR301
VR304 200Ω
304
649C
1000PF
C309
C307
0.1µF
-12VAD
To A/D
device
A/D select
Sample/Hold

6) D/A conversion circuit block

This circuit block outputs blood pressure waveforms after zero balancing and offset voltages for A/D conversion. Before A/D conversion, offset voltage is added according to each parameter.

While offset voltage is not outputted, IC822 analog switch is closed in timing of P1W signal selection and P1W signal is smoothed with IC816 high-cut filter and outputted from the connector on the front panel of the bedside monitor. P1W to the central monitor is generated inside the central monitor interface board.

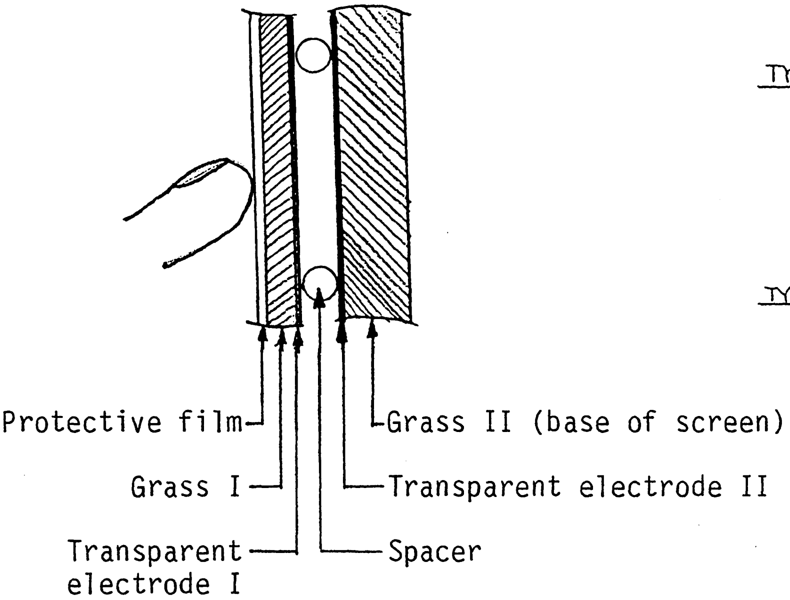


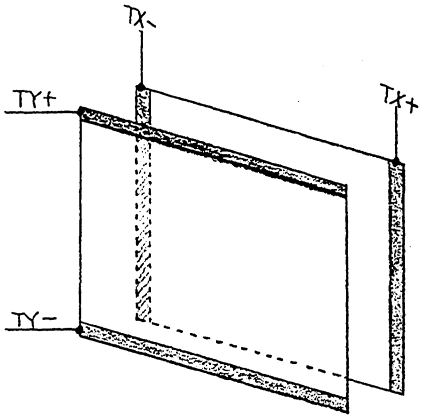
D/A timing signal
HC00
IC340
4504
IC332
ADOFFSET
14-1A
C335
330PF
R316
1.24KF
100Ω
VR303
R315
1.27KF
+8V
IC318
2/2
µPC812
-8V
R317
604ΩF
VR302
100Ω
IC318
1/2
µPC812
4053
IC822C
R331
15KF
0.1µF
C317
R332
33KΩ
C318
0.082µF
IC816
2/2
µPC812
R334
47Ω
P1W
BP1 wave
DATA-BUS
B12
B11
B10
B09
B08
B07
B06
B05
B04
B03
B02
B01
IO
COMP
V+
GND
V-
VREF (-)
VREF (+)
C310
47PF
C311
0.1µF
C312
0.1µF
+12VAD
-12VAD
10KF
R318
HA-17012
IC317
R319
10KF
+10VREF

7) Touch key intreface circuit block

Theory of touch key operation

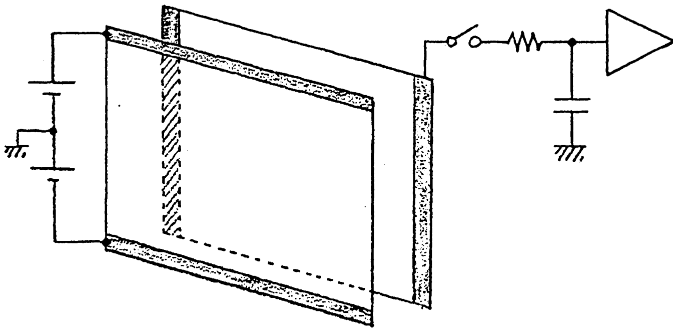
Touch key panel is composed of a plastic film for protection and two transparent grass electrodes on both sides of spacers. Voltage is applied to the electrodes to each X-axis direction and Y-axis direction. When finger touches to the surface of the panel, two electrodes touch and atttenuated voltages with touch are proportional to the touch position of finger. Touch position can be known by measuring voltages.


Protective film
Grass I
Transparent electrode I
Grass II (base of screen)
Transparent electrode II
Spacer

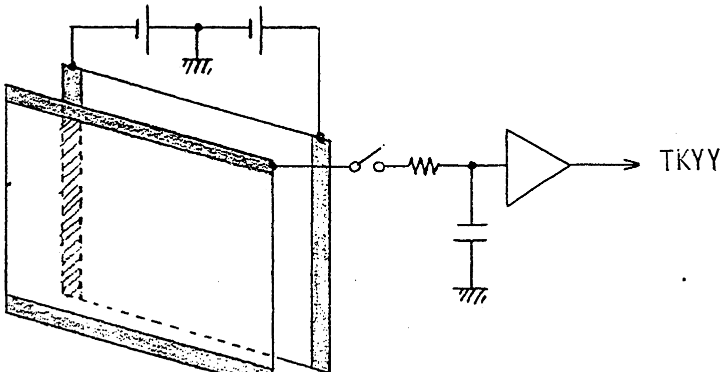


In actual design, voltage is applied to the two electrode alternately and attenuated voltages are picked up from the electrode to which voltage is not applied. Picked up voltages are held until the next cycle.

X/XY = L (Y-axis position detection)

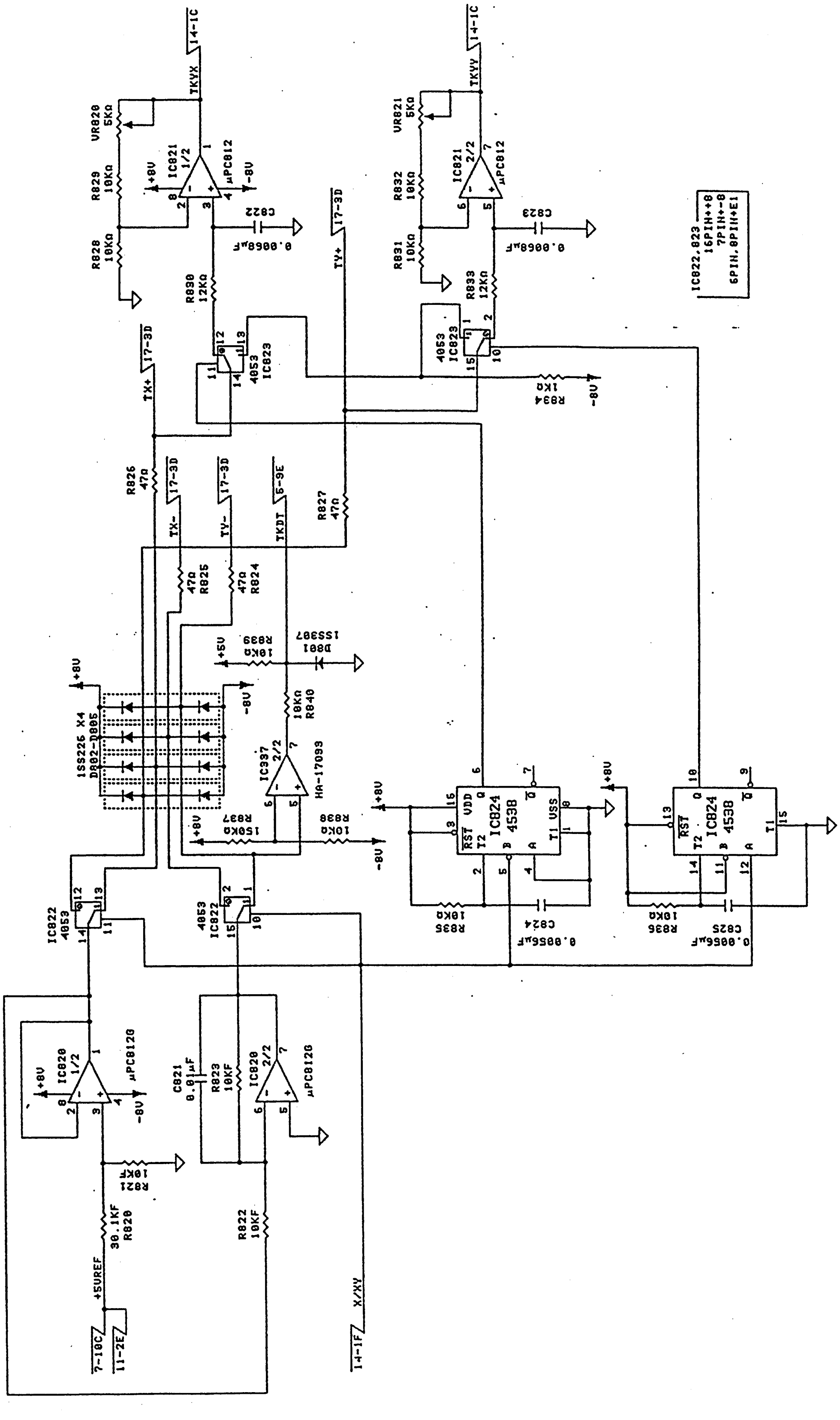


X/XY = H (X-axis position detection)



+5Vref voltage is regulated by IC820 and +1.25V and -1.25V voltages are generated. IC822 analog switch select voltage to be applied to each electrode alternately. Switching is controlled by X/XY signal.

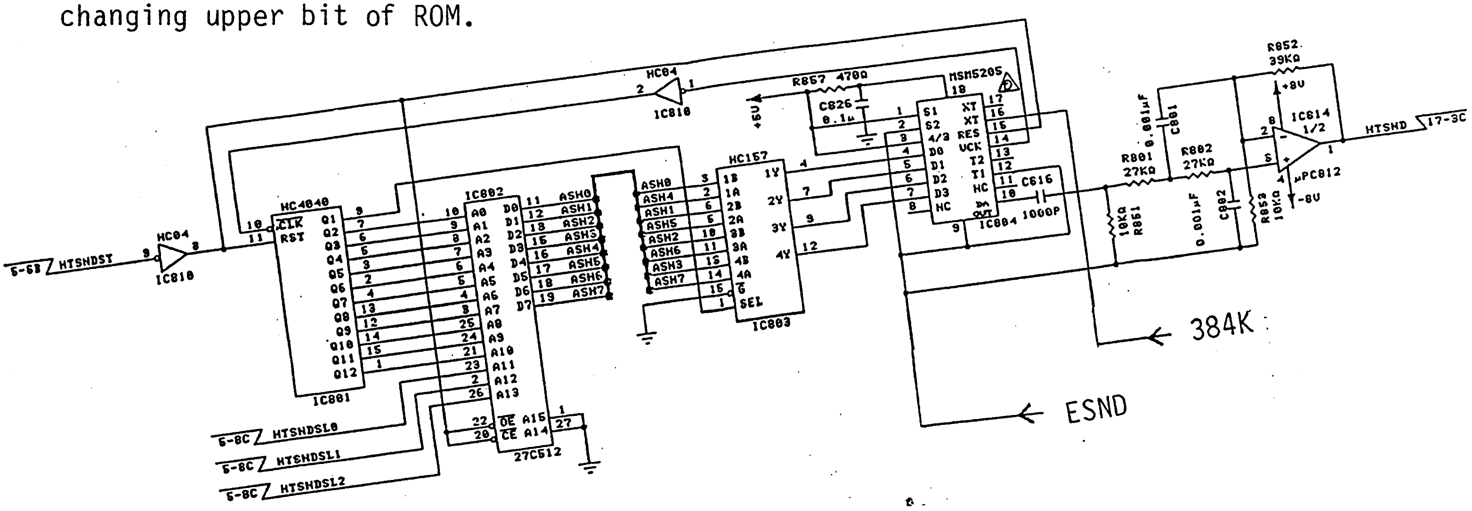
IC824 is a one-shot circuit to close the switch for voltage-hold in timing of X/XY signal. R830, C822 and IC821 1/2 are for X-axis detection and R833, C823 and IC821 2/2 are for Y-axis detection.


TKYX
14-1C
TKYY
14-1C
VR820 5KΩ
VR821 5KΩ
R829 10KΩ
R828 10KΩ
R832 10KΩ
R831 10KΩ
IC821 1/2
IC821 2/2
μPC812
+8V
-8V
C822 0.0068μF
C823 0.0068μF
R830 12KΩ
R833 12KΩ
4053 IC823
IC822,823 16PIN→+8 7PIN→-8 6PIN,8PIN→E1
TY+
17-3D
TX+
17-3D
R834 1KΩ
R826 47Ω
R827 47Ω
TX-
TY-
TKDT
6-9E
47Ω R825
47Ω R824
+5V
R839 10KΩ
D801 1SS387
1SS226 X4
D802-D805
IC397 2/2
HA-17093
10KΩ R840
R837 150KΩ
R838 10KΩ
IC824 4538
RST
T2
VDD
Q
Q̄
USS
T1
B
A
R835 10KΩ
C824 0.0056μF
R836 10KΩ
C825 0.0056μF
IC822 4053
4053 IC822
IC820 1/2
IC820 2/2
μPC812G
C821 0.01μF
R823 10KF
R821 10KF
R820 30.1KF
R822 10KF
+5VREF
7-10C
11-2E
X/XY
14-1F

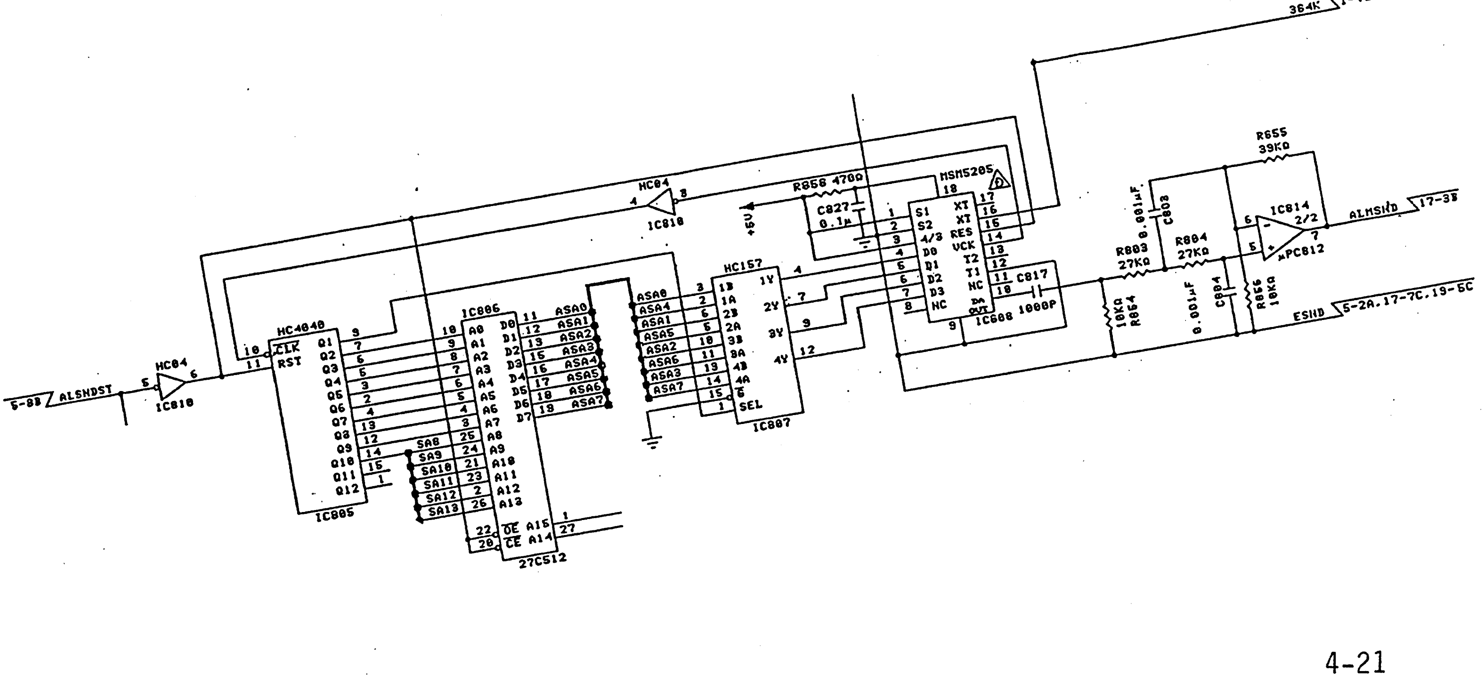
8) Sound circuit

Sound circuit generates alarm tone, QRS synchronized tone and key click tone. Each tone generation circuit is independent. A sound synthetic IC that can generate various tones is used for alarm tone and QRS tone generation but conventional tones only are used for the bedside monitor.

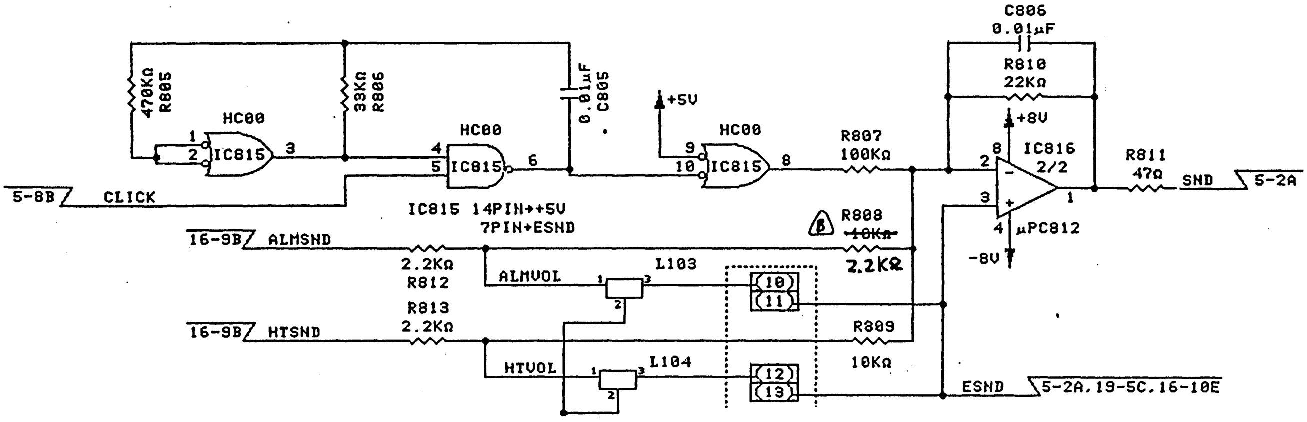
QRS synchronized tone is generated when address counter IC801 starts counting by HTSNDST signal. Data of address counter accesses IC802 ROM successively. As data from ROM is 8 bits, uppper digit and lower digit are switched by lowest bit of the counter to coincide to the IC804 sound synthetic IC. Tones can be chosen by changing upper bit of ROM.


5-6B HTSNDST
HC04
IC810
HC4040
CLK
RST
IC801
IC802
27C512
HC157
IC803
MSM5205
IC804
R857 470Ω
C826 0.1µ
+5V
C816 1000P
R852 39KΩ
C801 0.001µF
R801 27KΩ
R802 27KΩ
R851 10KΩ
C802 0.001µF
R853 10KΩ
IC814 1/2
µPC812
+8V
-8V
HTSND 17-3C
5-8C HTSNDSL0
5-8C HTSNDSL1
5-8C HTSNDSL2
ASH0
ASH1
ASH2
ASH3
ASH4
ASH5
ASH6
ASH7
384K
ESND

In the same manner as QRS tone, alarm tone is generated when address counter IC805 starts counting. For alarm tone generation, upper address sets to counters on IC811 and IC812 by the CPU. In opposite way, counter address of currently generated tone can be read. Therefore alarm tone length can be freely selected. In the same manner of QRS tone, upper digit and lower digit is switched by lowest bit of counter to coincide to the IC808 sound synthetic IC. IC814 1/2 and IC814 2/2 are for a high cut filter to remove high frequency component from the sound synthetic IC output signal. Cut-off frequency of this filter is 6kHz.


364K 1-7E,14-4E
5-8B ALSNDST
HC04
IC810
HC4040
IC805
IC806
27C512
SA8
SA9
SA10
SA11
SA12
SA13
ASA0
ASA1
ASA2
ASA3
ASA4
ASA5
ASA6
ASA7
HC157
IC807
MSM5205
IC808
R856 470Ω
C827 0.1µ
+5V
C817 1000P
R855 39KΩ
C803 0.001µF
R803 27KΩ
R804 27KΩ
R854 10KΩ
C804 0.001µF
R856 10KΩ
IC814 2/2
µPC812
ALMSND 17-3B
ESND 5-2A,17-7C,19-5C

Alarm tone and QRS tone are independently adjustable by the volumes on the front panel of the bedside monitor. Tone signals are added to key click tone by IC816 and sent to audio power amplifier on the CRTC board in the SND signal line.

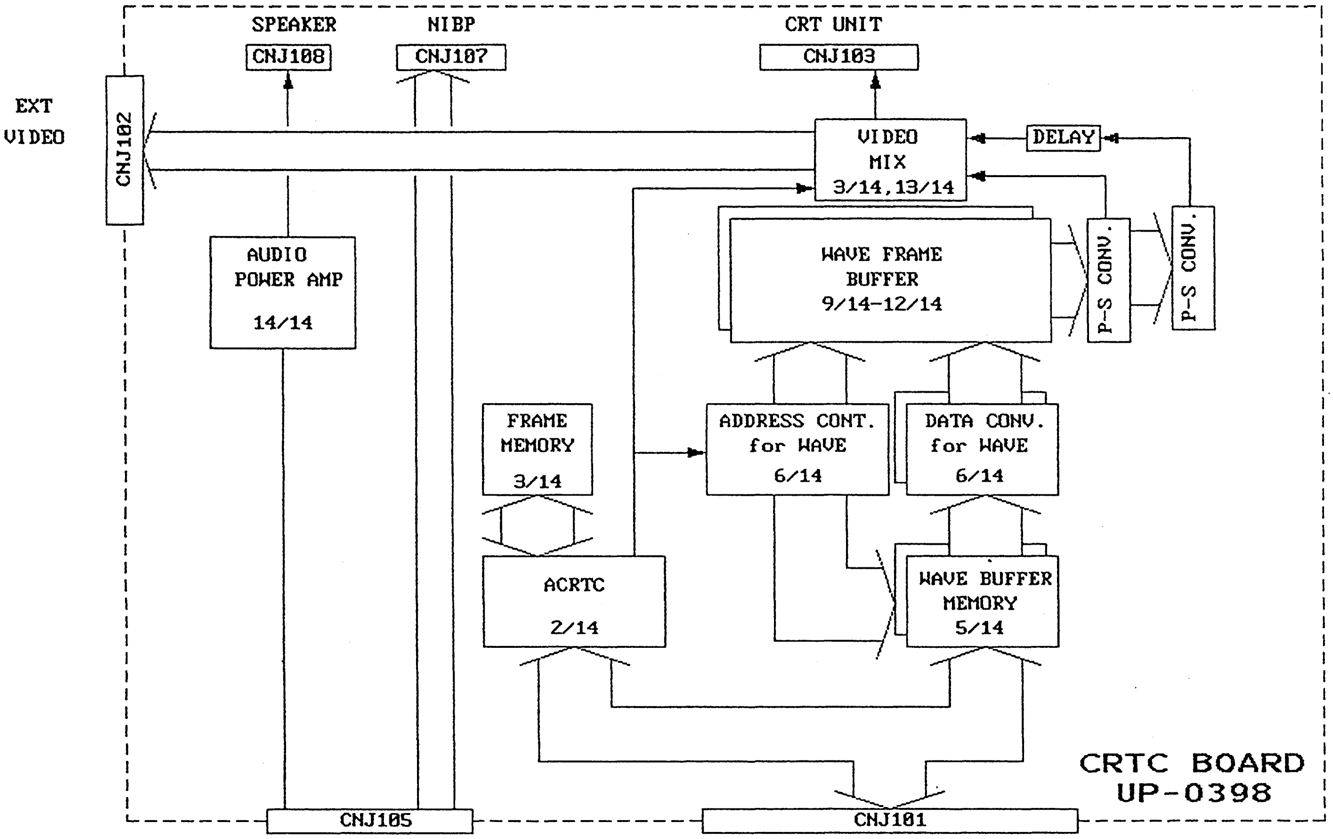

C806
0.01µF
R810
22KΩ
+8V
IC816
2/2
µPC812
-8V
R811
47Ω
SND
5-2A
470KΩ
R805
33KΩ
R806
0.01µF
C805
+5V
HC00
IC815
R807
100KΩ
5-8B
CLICK
IC815 14PIN→+5V
7PIN→ESND
16-9B
ALMSND
2.2KΩ
R812
ALMVOL
L103
R808
~~10KΩ~~
2.2KΩ
R813
2.2KΩ
16-9B
HTSND
HTVOL
L104
R809
10KΩ
10
11
12
13
ESND
5-2A,19-5C,16-10E

4.2.2 CRTC board UP-0398

CRTC board generates signals for screen display of numerical data such as heart rate, BP values, etc., trendgraphs, and waveforms such as ECG, BP, and respiration curve, etc. This board also provides with a connector for an external display monitor which permits color display.

Character and graphic data and command are written into the ACRTC (Advanced CRT Controller) and waveform data are written into waveform buffer RAM for display.

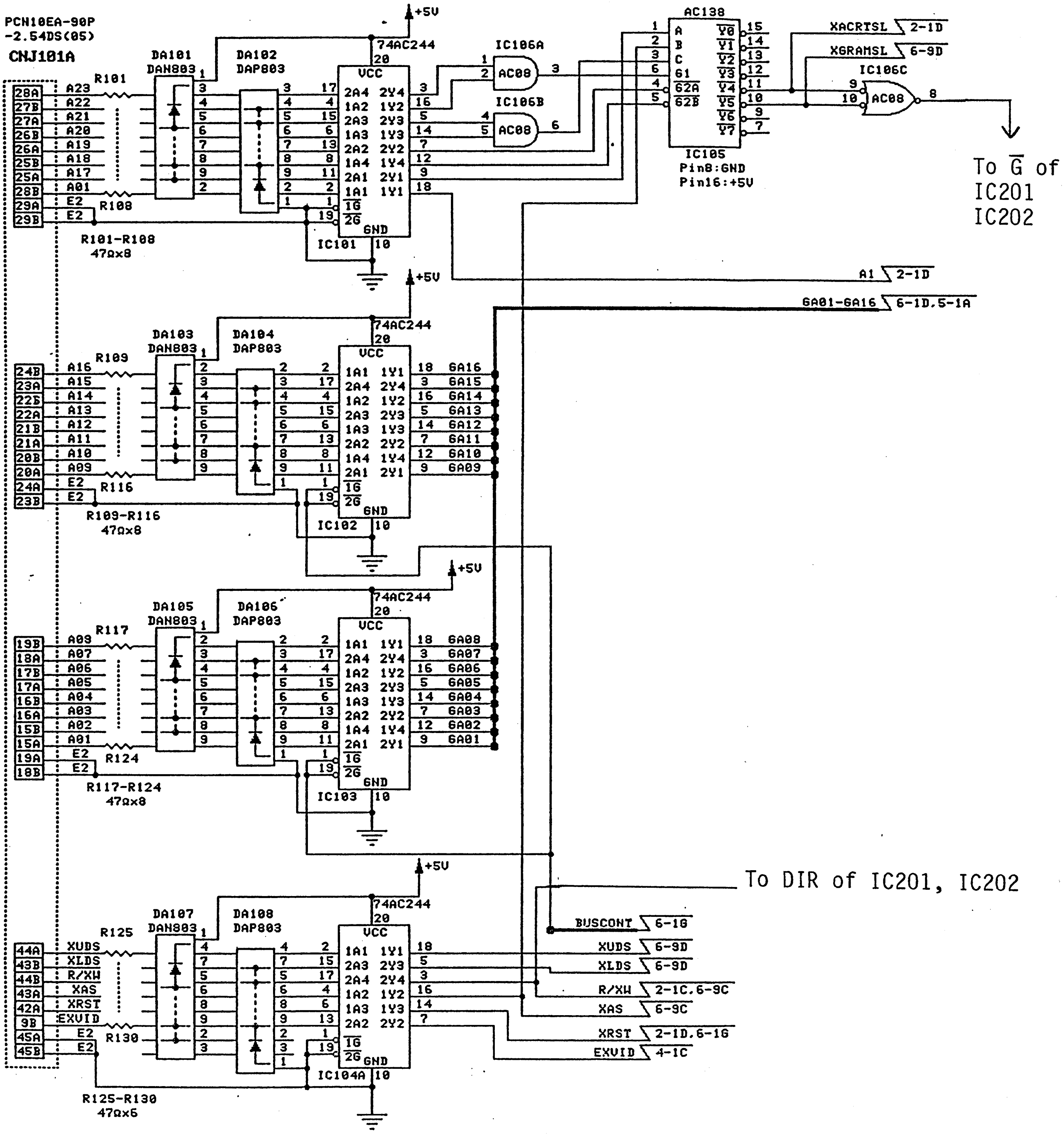
System clock is generated in this CRTC board for main board. The CRTC board interconnects the NIBP unit and the main board and sound audio power amplifier circuit is mounted.


SPEAKER
CNJ108
NIBP
CNJ107
CRT UNIT
CNJ103
EXT VIDEO
CNJ102
VIDEO MIX 3/14,13/14
DELAY
AUDIO POWER AMP 14/14
WAVE FRAME BUFFER 9/14-12/14
P-S CONV.
P-S CONV.
FRAME MEMORY 3/14
ADDRESS CONT. for WAVE 6/14
DATA CONV. for WAVE 6/14
ACRTC 2/14
WAVE BUFFER MEMORY 5/14
CRTC BOARD UP-0398
CNJ105
CNJ101

1) CPU interface circuit block

There are protection circuit for the address bus A01- A23 from the main board and control signals on the CRTC board. Upper address A23- A17 via buffer IC101 becomes chip select signals for ACRTC (Advanced CRT Controller) on the character/graphic display circuit and for ACW (Address Controller for Waveform) on the waveform display circuit by IC106 and IC105. Inside the ACW, ACW becomes chip select signal for waveform buffer RAM together with XUDS, XLDS and R/XW signals.

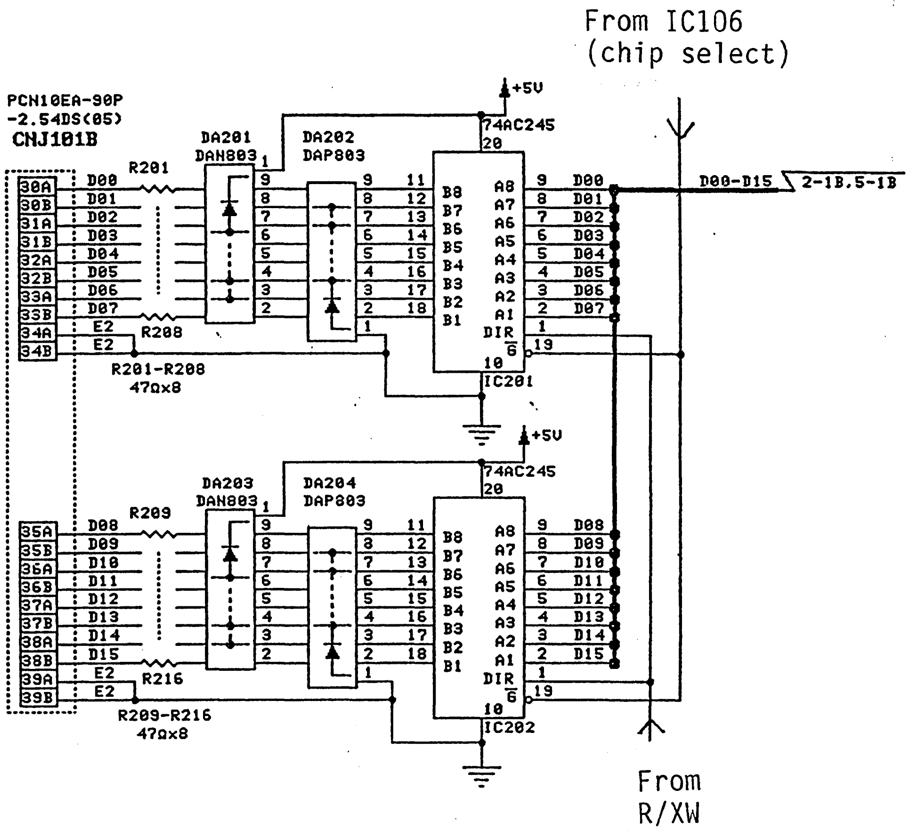
Lower address A16- A01 becomes waveform buffer RAM address GA01- GA16 via buffer IC102 and IC103 by control of BCONT signal from ACW.


PCN10EA-90P
-2.54DS(05)
CNJ101A
R101
DA101
DAN803
DA102
DAP803
74AC244
VCC
GND
IC101
R101-R108
47Ω×8
R108
A23
A22
A21
A20
A19
A18
A17
A01
E2
IC106A
IC106B
AC08
AC138
IC105
Pin8:GND
Pin16:+5V
IC106C
XACRTSL 2-1D
XGRAMSL 6-9D
A1 2-1D
GA01-GA16 6-1D.5-1A
+5V
DA103
DAN803
DA104
DAP803
R109
R116
IC102
R109-R116
47Ω×8
A16
A15
A14
A13
A12
A11
A10
A09
GA16
GA15
GA14
GA13
GA12
GA11
GA10
GA09
DA105
DAN803
DA106
DAP803
R117
R124
IC103
R117-R124
47Ω×8
A08
A07
A06
A05
A04
A03
A02
A01
GA08
GA07
GA06
GA05
GA04
GA03
GA02
GA01
DA107
DAN803
DA108
DAP803
R125
R130
IC104A
R125-R130
47Ω×6
XUDS
XLDS
R/XW
XAS
XRST
EXVID
BUSCONT 6-1G
XUDS 6-9D
XLDS 6-9D
R/XW 2-1C.6-9C
XAS 6-9C
XRST 2-1D.6-1G
EXVID 4-1C

To $\overline{G}$ of IC201 IC202

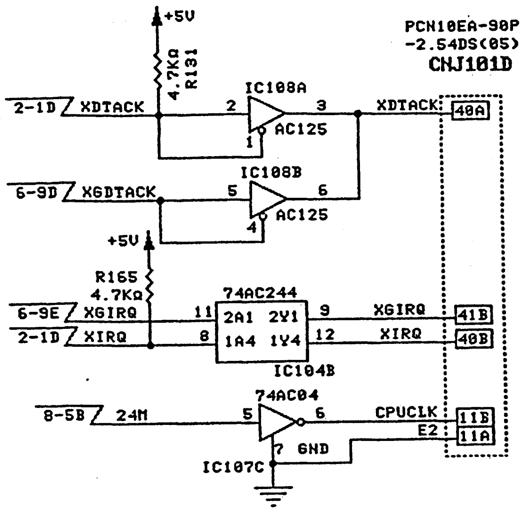
To DIR of IC201, IC202

Data bus D00- D15 becomes internal bus (D00- D15) in the CRTC board via data buffer IC201 and IC202 by control of chip select signals of ACRTC and ACW and then becomes data signal to the ACRTC and waveform buffer RAM.


From IC106
(chip select)
PCN10EA-90P
-2.54DS(05)
CNJ101B
DA201
DAN803
DA202
DAP803
R201
R208
R201-R208
47Ω×8
+5V
74AC245
IC201
D00-D15
2-1B,5-1B
DA203
DAN803
DA204
DAP803
R209
R216
R209-R216
47Ω×8
IC202
E2
DIR
From
R/XW

XDTACK acknowledge signal, XIRQ and XGIRQ interrupt signals and clock signal are sent back to the main board.

Acknowledge signals from the ACRTC and ACW pass through 3-state buffer IC108A and with the output signals they are operated with wired OR logic to be XDACK signal and then sent to the main board. XIQR and XGIRQ signals are separately sent to the main board after buffer IC104B.


+5V
4.7KΩ
R131
PCN10EA-90P
-2.54DS(05)
CNJ101D
IC108A
2-1D XDTACK
AC125
XDTACK
40A
IC108B
6-9D XGDTACK
AC125
R165
4.7KΩ
74AC244
6-9E XGIRQ
2-1D XIRQ
2A1 2Y1
1A4 1Y4
IC104B
XGIRQ
XIRQ
41B
40B
74AC04
8-5B 24M
CPUCLK
E2
11B
11A
GND
IC107C

2) Character/graphic display circuit block

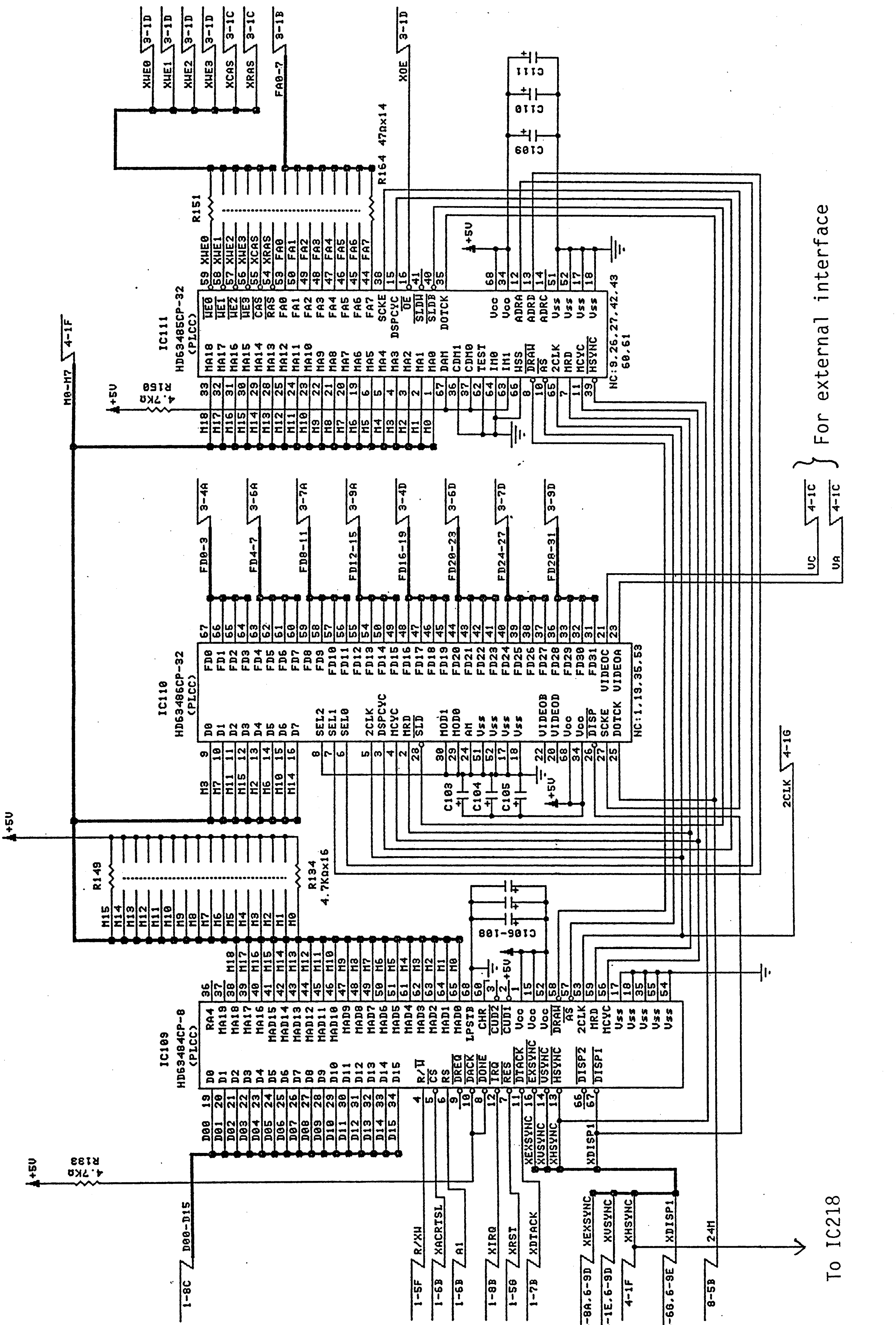
This circuit block draws characters and trendgraph into graphic RAM using data from CPU with ACRTC and its related devices.

ACRTC (Advanced CRT Controller IC109) generates data for drawing into graphic RAM by control of CPU. Also it converts into internal bus (M0- M18) for communciation with the ACRTC related devices and generates synchronization signals SYNC, XVSYNC, XHSYNC, and XDISP1 that are necessory for CRT display. With these signals, CRT raster scanning is made in 24.59kHz horizontally and 62.03Hz vertically with 793 raster lines of interlaced scanning. Synchronization signals are used for waveform display and character/graphic display and waveform display are synchronized.

When ACRTC receives data and commands from CPU, it turns XDACK to active to inform CPU receipt of data. After data reception, ACRTC starts received command and after finishing the command, ACRTC outputs XIRQ to CPU to inform end of command. Therefore, data transfer between ACRTC and CPU is done only when screen is re-drawn.

In this bedside monitor, character font (bit image) is transferred from character ROM in the ROM pack to non-displaying area of graphic RAM through CPU and ACRTC at power on. Font data is output from the graphic RAM with copy command for character/graphic display. Therefore there is no special character ROM on the CRTC board.

ACRTC device outputs graphic RAM address information and data time-sharingly to its internal bus and MCYC (Memory CYCle) signal indicates which is being output. IC110 reads out data and IC111 reads out address information and access into graphic RAM. Attribute information which is written in synchronization with horizontal synchronization signal is being output. It is possible to output externally by latching this data. In this bedside monitor, attribute information is is output with color palette so that an external color display monitor can be used.

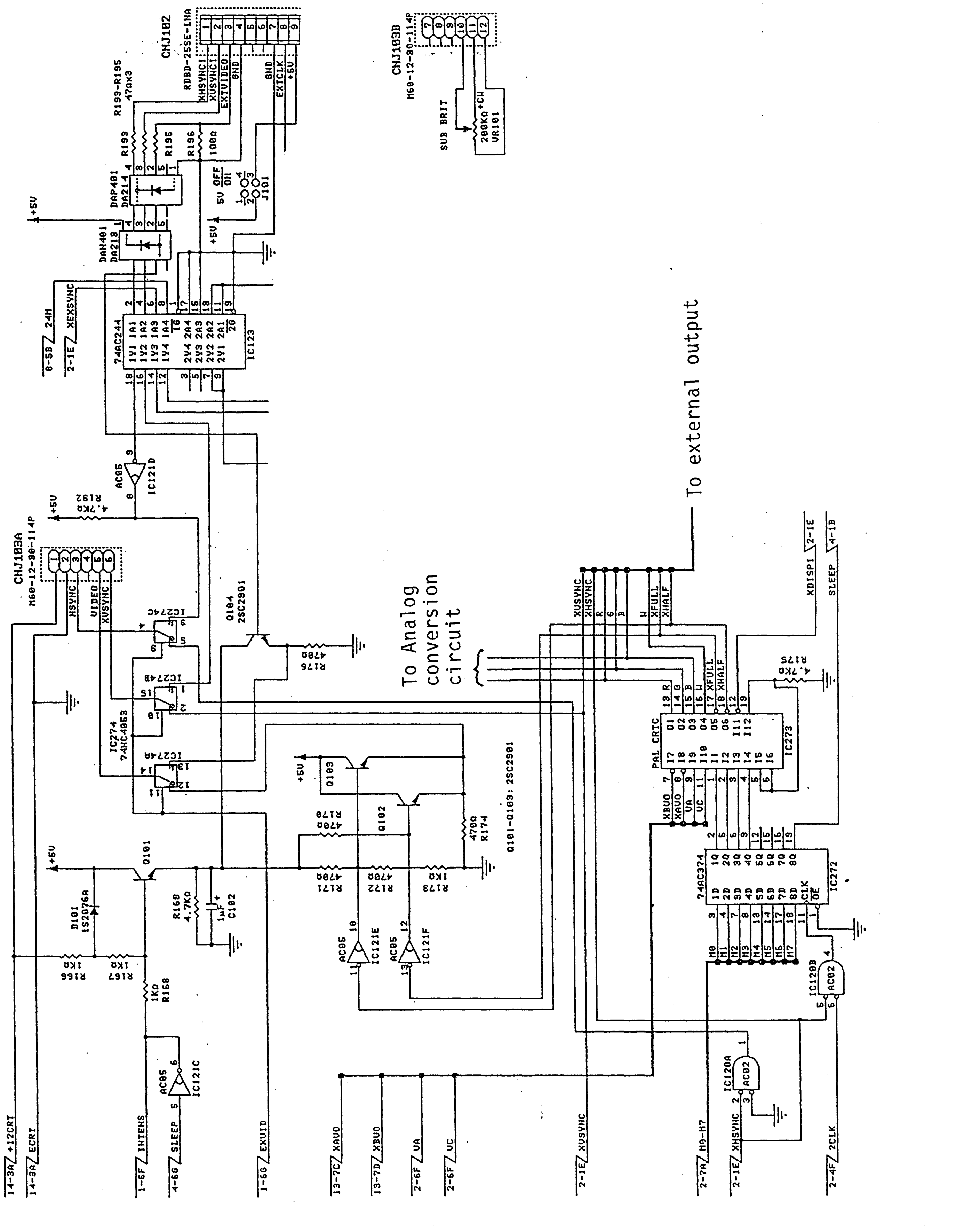

IC109
HD63484CP-8
(PLCC)
IC110
HD63486CP-32
(PLCC)
IC111
HD63485CP-32
(PLCC)
NC:1,19,35,53
NC:9,26,27,42,43
60,61
R149
R134
4.7KΩx16
R150
4.7KΩ
R133
4.7KΩ
R151
R164 47Ωx14
C103
C104
C105
C106-108
C109
C110
C111
+5V
D00-D15
M0-M7
FA0-7
FD0-3
FD4-7
FD8-11
FD12-15
FD16-19
FD20-23
FD24-27
FD28-31
XWE0
XWE1
XWE2
XWE3
XCAS
XRAS
XOE
VC
VA
2CLK
R/XW
XACRTSL
A1
XIRQ
XRST
XDTACK
XEXSYNC
XVSYNC
XHSYNC
XDISP1
24M
For external interface
To IC218

3) External interface circuit block

This circuit block composes of video signals from character/graphic display circuit block and waveform display circuit block to be converted into analog signal to display on the CRT screen.

Video signals of TTL level from character/graphic display circuit and waveform display circuit are converted into analog video signal with Q102 and Q103 after passing through IC273 and IC121E-F for CRT display by the bedside monitor. This video signal for both character/graphic and waveform has 2 bits information per one dot. With combination of 2 dots, full brightness, half brightness and off can be selected.

J101 is a jumper to supply external instrument with +5V power. The uppermost bit of attribute information is for sleep mode screen. When it is "H", screen is of sleep mode. Q101 is for sleep mode control and brightness adjustment. VR101 sets adjustable brightness range of display.


To external output
To Analog conversion circuit
CNJ102
RDBD-25SE-LHA
XHSYNC1
XVSYNC1
EXTVIDEO
GND
GND
EXTCLK
+5V
R193-R195
47Ω×3
R193
R195
R196
100Ω
DAP401
DA214
DAN401
DA213
5V OFF
ON
J101
+5V
CNJ103B
M60-12-30-114P
SUB BRIT
200KΩ CW
VR101
8-5B 24M
2-1E XEXSYNC
74AC244
IC123
AC05
IC121D
R192
4.7KΩ
CNJ103A
M60-12-30-114P
HSYNC
VIDEO
XVSYNC
IC274C
IC274B
IC274A
IC274
74HC4053
Q104
2SC2901
R176
470Ω
Q103
Q102
Q101
Q101-Q103: 2SC2901
R170
470Ω
R171
470Ω
R172
470Ω
R173
1KΩ
R174
470Ω
D101
1S2076A
R169
4.7KΩ
1μF
C102
R166
1KΩ
R167
1KΩ
R168
1KΩ
IC121E
IC121F
IC121C
XVSYNC
XHSYNC
R
G
B
W
XFULL
XHALF
XDISP1
SLEEP
2-1E
4-1B
R175
4.7KΩ
PAL CRTC
IC273
XBVO
XAVO
VA
VC
74AC374
IC272
CLK
OE
M0
M1
M2
M3
M4
M5
M6
M7
IC120B
AC02
IC120A
AC02
14-3A +12CRT
14-3A ECRT
1-6F IHTENS
4-6G SLEEP
1-6G EXVID
13-7C XAVO
13-7D XBVO
2-6F VA
2-6F VC
2-1E XVSYNC
2-7A M0-M7
2-1E XHSYNC
2-4F 2CLK

4) Waveform buffer RAM circuit block

Waveform buffer RAM is for storage of command signal from CPU and waveform data. Waveform buffer RAM is separated into two groups which always work in parallel. This is to increase horizontal resolution of the screen and obtain 6 or 8 waveform traces.

There are two buffer RAM accesses. One is that ACW reads data from CPU as command data and the other is that DCW reads waveform data and writes it into waveform buffer RAM. Both accesses are controlled by ACW.

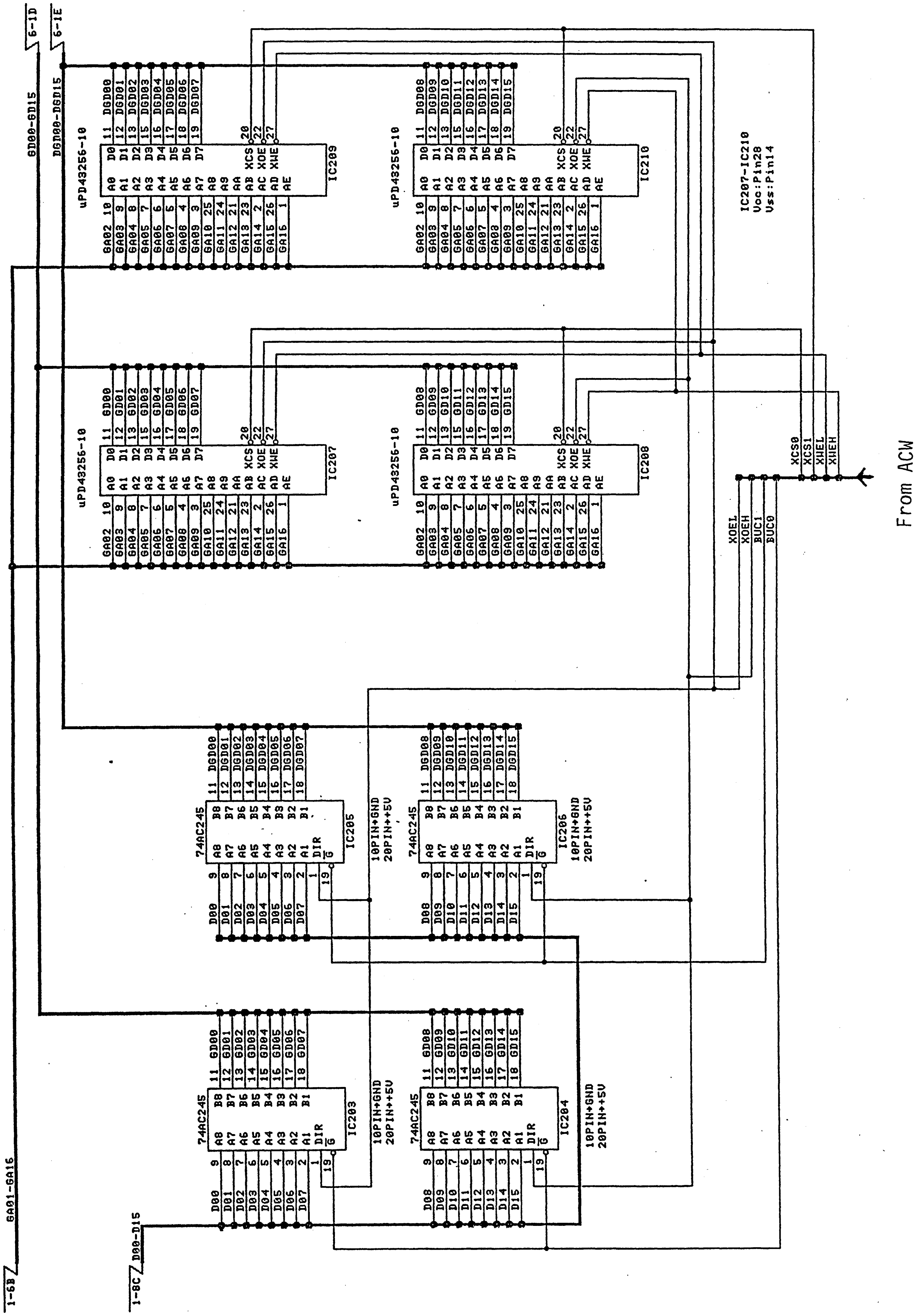
Usually, address bus GA02- GA16 is controlled by address bus of CPU. When accessing by ACW, BCONT (Bus CONTrol) signal separates CPU bus from internal bus with IC102 and IC103. The lowest address GA01 of CPU branches internal bus D00-D15 into two groups of GD00- GD15 and DGD00- DGD15 and also swithes BUC0/1 and XCS0/1.

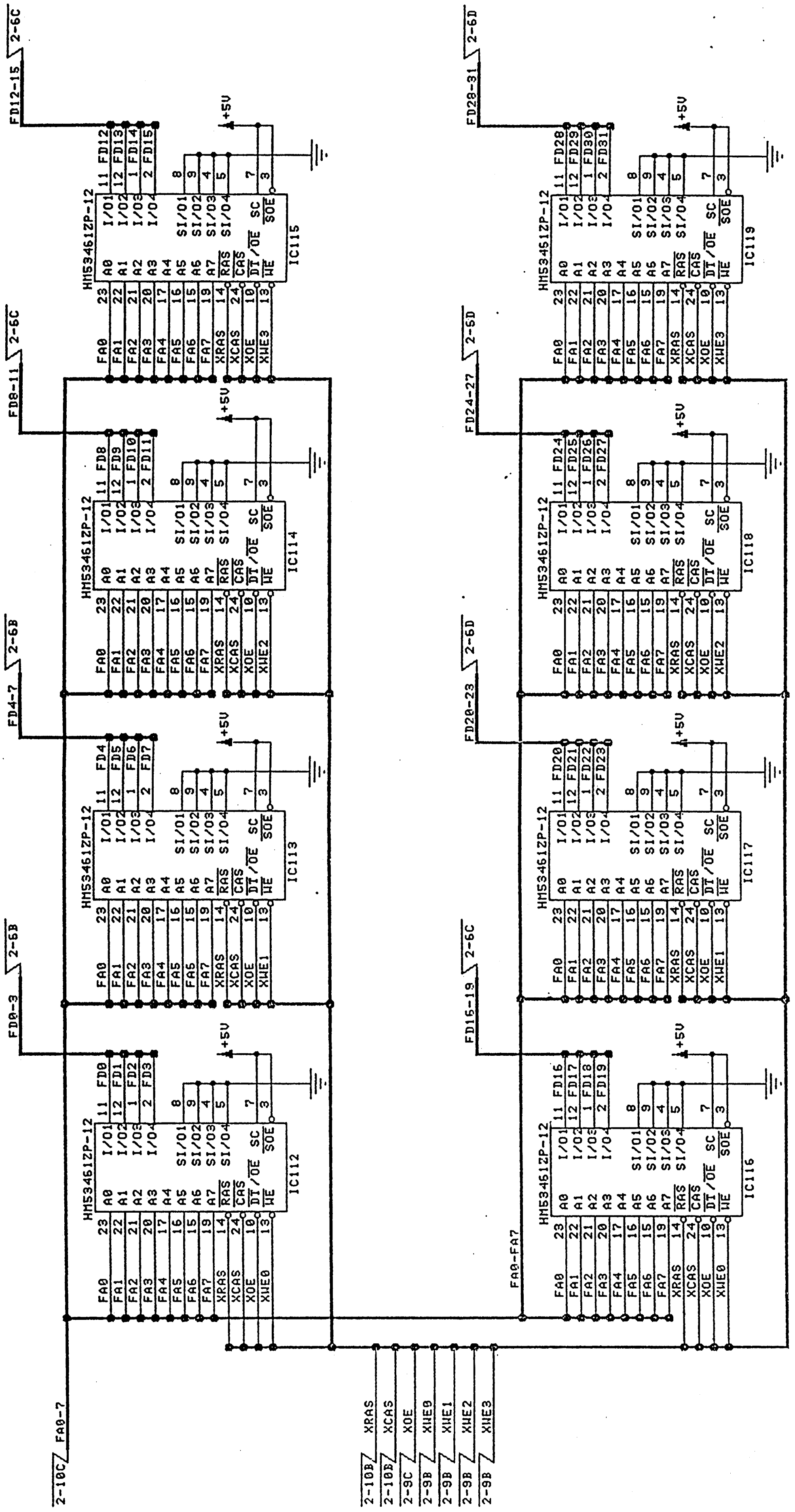
When access competes with CPU, XGDTACK is delayed and CPU waits. XOEH/L and XWEH/L are switched by upper byte and lower byte. For example, from the viewpoint of CPU even words whose GA01="0" are accessed with memory chips as follows:

xxx0, xxx4, xxx8, xxxC: IC207
xxx1, xxx5, xxx9, xxxD: IC208

In the same manner odd words whose GA01="1" are accessed with memory chips as follows:

xxx2, xxx6, xxxA, xxxE: IC209
xxx3, xxx7, xxxB, xxxF: IC210.


1-6B
GA01-GA16
1-8C
D00-D15
6-1D
GD00-GD15
6-1E
DGD00-DGD15
uPD43256-10
IC207
IC208
IC209
IC210
74AC245
IC203
IC204
IC205
IC206
10PIN→GND
20PIN→+5V
IC207-IC210
Vcc:Pin28
Vss:Pin14
XCS0
XCS1
XWEL
XWEH
XOEL
XOEH
BUC1
BUC0
From ACW


HM53461ZP-12
IC112
IC113
IC114
IC115
IC116
IC117
IC118
IC119
A0
A1
A2
A3
A4
A5
A6
A7
RAS
CAS
DT/OE
WE
I/O1
I/O2
I/O3
I/O4
SI/O1
SI/O2
SI/O3
SI/O4
SC
SOE
+5V
FA0-7
FA0-FA7
FA0
FA1
FA2
FA3
FA4
FA5
FA6
FA7
XRAS
XCAS
XOE
XWE0
XWE1
XWE2
XWE3
FD0-3
FD4-7
FD8-11
FD12-15
FD16-19
FD20-23
FD24-27
FD28-31
2-10C
2-10B
2-9C
2-9B
2-6B
2-6C
2-6D

5) Waveform conversion circuit block

This circuit block converts waveform data written into waveform buffer into dot data (drawing) for screen display. This operation is the most important for waveform display. Almost of all the operation is done by DCW and waveform frame memory and address signal from ACW sometimes access the operation.

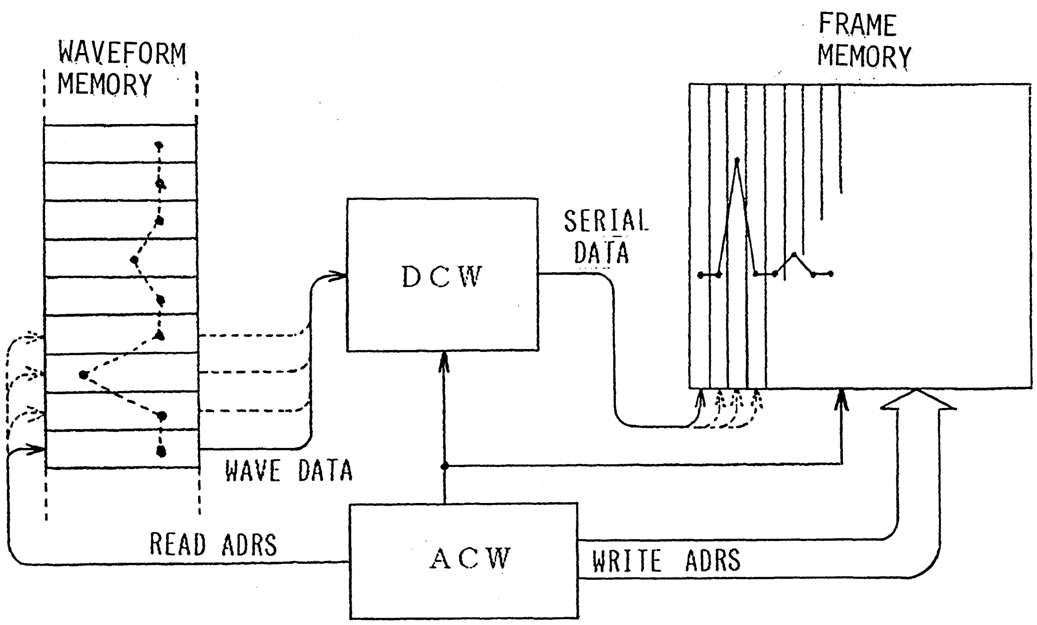
Waveform frame memory provides shift register function and accesses one by one with clock input to memory. In this bedside monitor, waveform data output from serial port is dot interpolated.

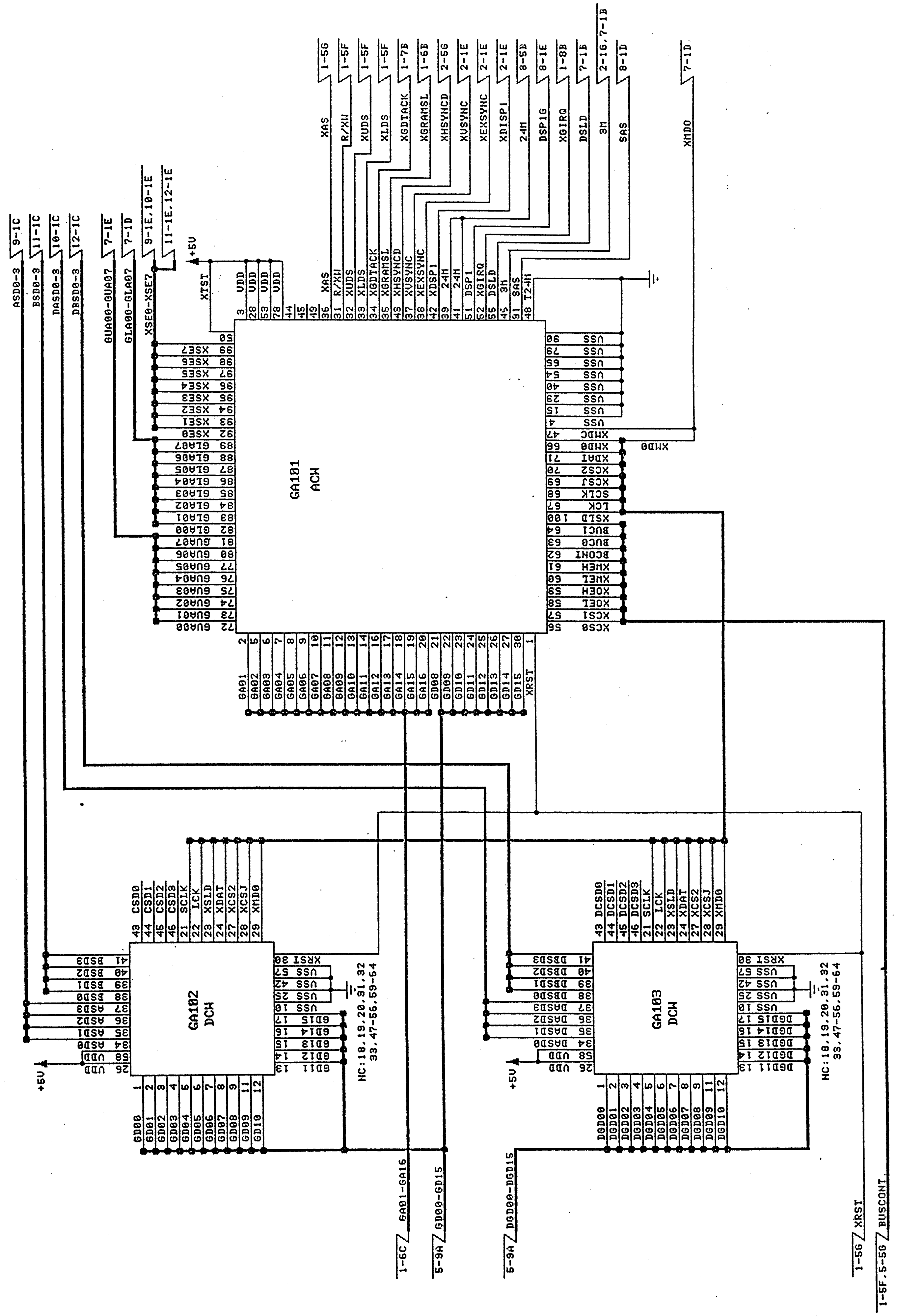
Details of drawing

At rising of DSLD (Delayed Serial Lead Data), ACW device GA101 outputs address data to waveform buffer RAM and starts accessing. DCW devices GA102 and GA103 acquire 16 data (4 data x 4 traces = 16) from waveform buffer RAM by LCK (Latch ClocK) signal from ACW.

With XSLD (Serial Lead Data) signal generated before the next DSLD output, counter inside DCW is cleared and after the next DSLD output, by using SCLK (Shift ClocK) signal from ACW, aquired data is interpolated and output to ASDO- 3 ("A" Shift Data), BSDO- 3 ("B" Shift Data), DASDO- 3 (Delayed "A" Shift Data), and DBSDO- 3 (Delayed "B" Shift Data).

On the other hand, waveform frame memory (IC230- 237, IC240- 247, IC250- 257, IC260- 267) whose address is set simultaneously with DSLD, aquires serial data from the SI/OO- 4 terminal by using SAS (Serial Access Strobe) signal as clock signal. ACW switches address to waveform buffer memory or waveform frame memory every XSLD (DSLD) and repeats above procedures.



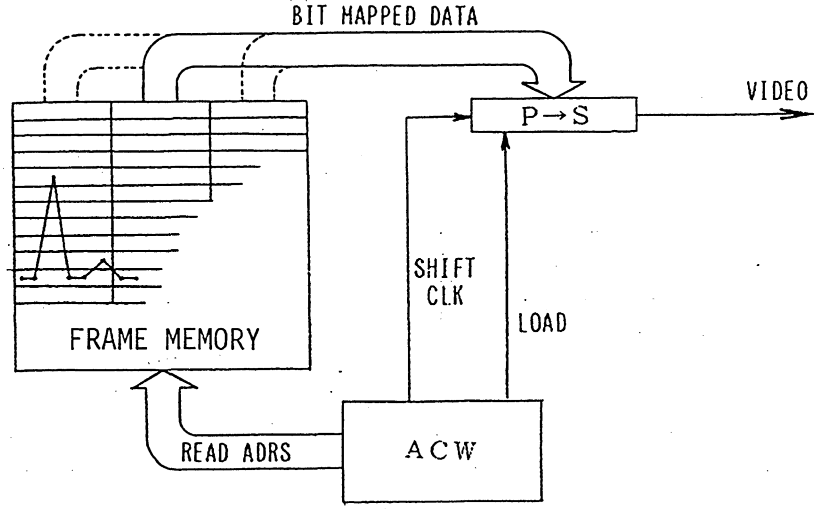

GA101
ACW
GA102
DCW
GA103
DCW
XAS 1-5G
R/XW 1-5F
XUDS 1-5F
XLDS 1-5F
XGDTACK 1-7B
XGRAMSL 1-6B
XHSYNCD 2-5G
XVSYNC 2-1E
XEXSYNC 2-1E
XDISP1 2-1E
24M 8-5B
DSP1G 8-1E
XGIRQ 1-8B
DSLD 7-1B
3M 2-1G,7-1B
SAS 8-1D
XMD0 7-1D
ASD0-3 9-1C
BSD0-3 11-1C
DASD0-3 10-1C
DBSD0-3 12-1C
GUA00-GUA07 7-1E
GLA00-GLA07 7-1D
XSE0-XSE7 9-1E,10-1E
11-1E,12-1E
+5V
XTST
VDD
VSS
XMD0
GA01-GA16 1-6C
GD00-GD15 5-9A
DGD00-DGD15 5-9A
XRST 1-5G
BUSCONT 1-5F,5-5G
NC:18,19,20,31,32
33,47-56,59-64

6) Waveform display circuit block

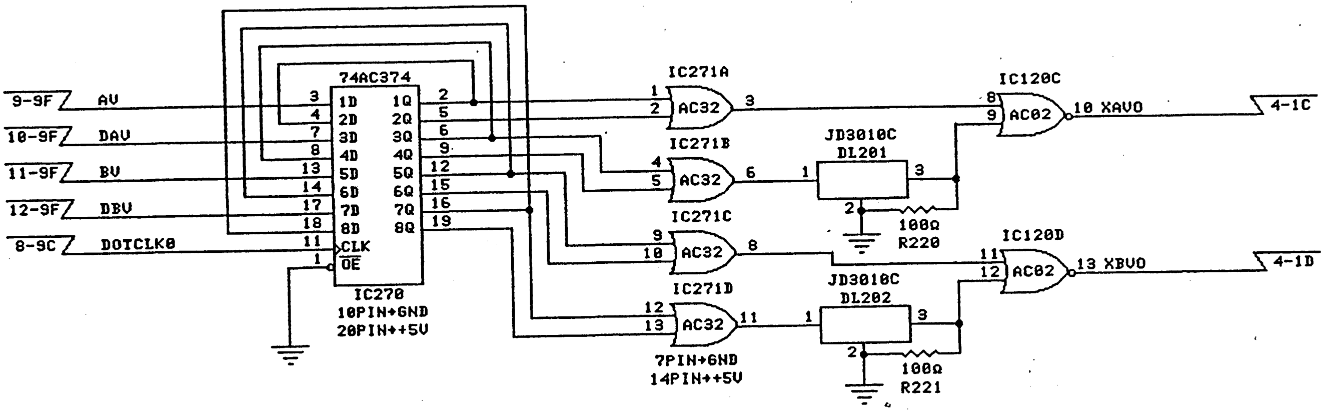
Dot data written into waveform frame memory is vertical/horizontal converted and read out from parallel port. This parallel data is again converted into serial data by shift register as video signal for screen display.

Two data groups brached in waveform buffer RAM are added by shifting half dot time to increase horizontal resolution of the screen display. This output signal is transferred to external interface circuit block.

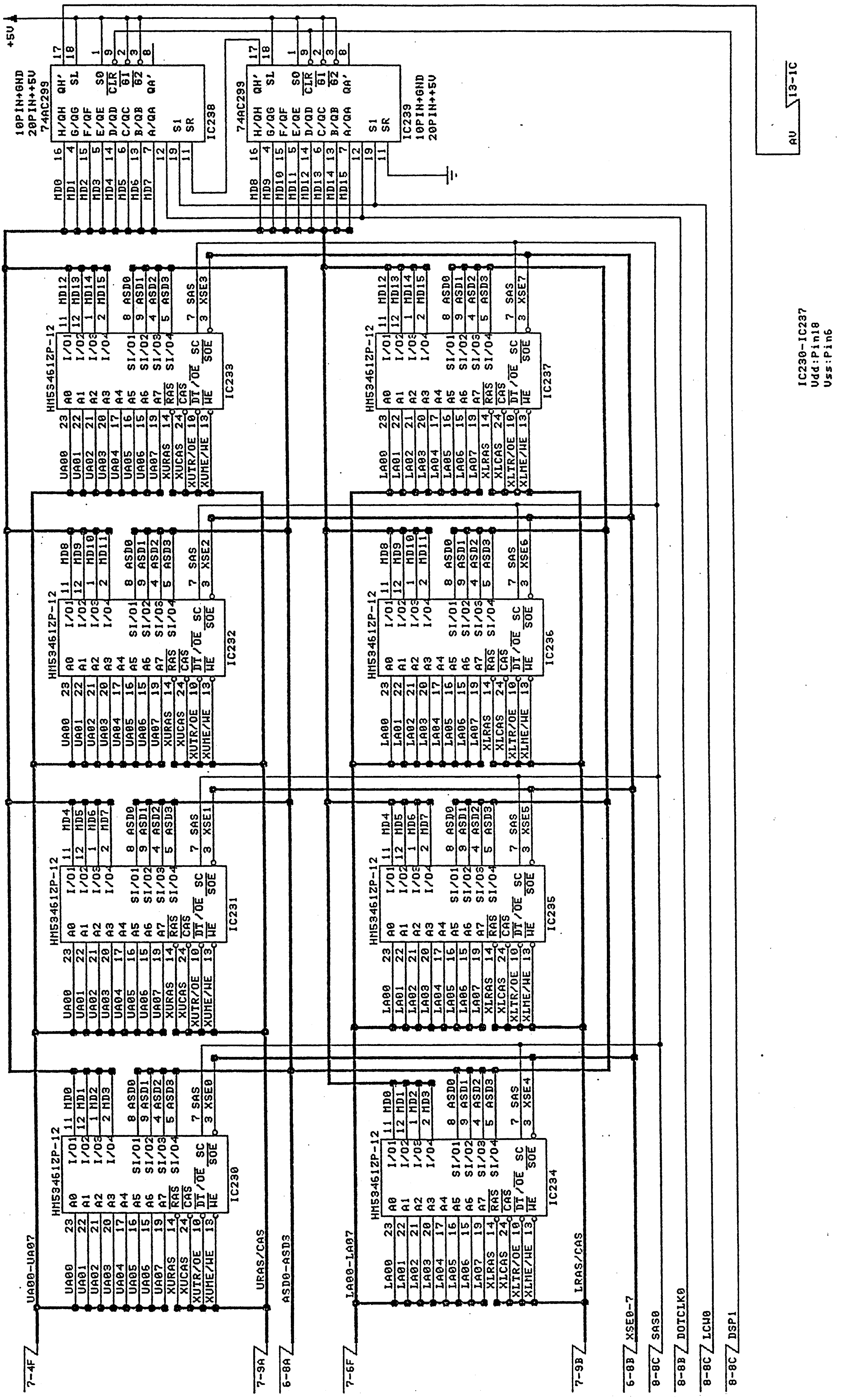
Dot data drawn vertically is read out horizontally (corresponding to CRT screen) for horizontal electron beam scanning on the screen.


BIT MAPPED DATA
P→S
VIDEO
SHIFT CLK
LOAD
FRAME MEMORY
READ ADRS
ACW

Display address counter in ACW is cleared by XDSP1 (DiSPlay) signal from ACRTC and DSP1G is output to start waveform display. Synchronized with 3M (3MHz clock) from ACW, ACW accesses waveform frame memory, shift resistor (IC238- 239, IC248- 249, IC258- 259, IC268- 269) and simultaneously latches 16 bits of data from waveform frame memory. Latches data is output from shift register by 49MHz dot clock signal and acquired by IC270 latch device and once more synchronized with clock. Output pulses of IC270 are widened by IC271 and one of two data groups branched in waveform buffer RAM is half dot time delayed by DL201 or DL202 and two groups of signals are added.

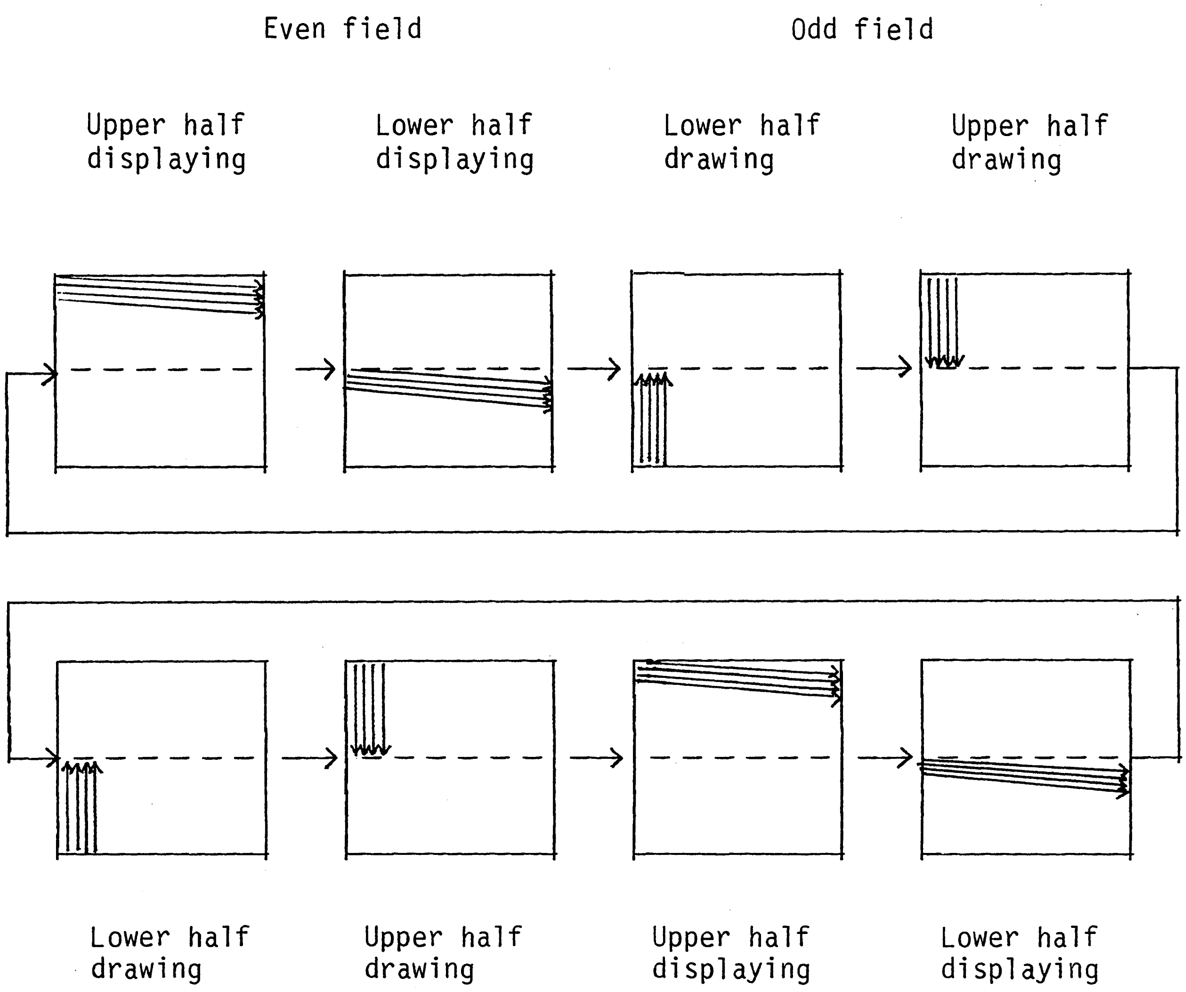

9-9F
AV
10-9F
DAV
11-9F
BV
12-9F
DBV
8-9C
DOTCLK0
74AC374
1D
2D
3D
4D
5D
6D
7D
8D
CLK
OE
1Q
2Q
3Q
4Q
5Q
6Q
7Q
8Q
IC270
10PIN+GND
20PIN++5V
IC271A
AC32
IC271B
AC32
IC271C
AC32
IC271D
AC32
7PIN+GND
14PIN++5V
JD3010C
DL201
JD3010C
DL202
100Ω
R220
100Ω
R221
IC120C
AC02
10 XAVO
IC120D
AC02
13 XBVO
4-1C
4-1D

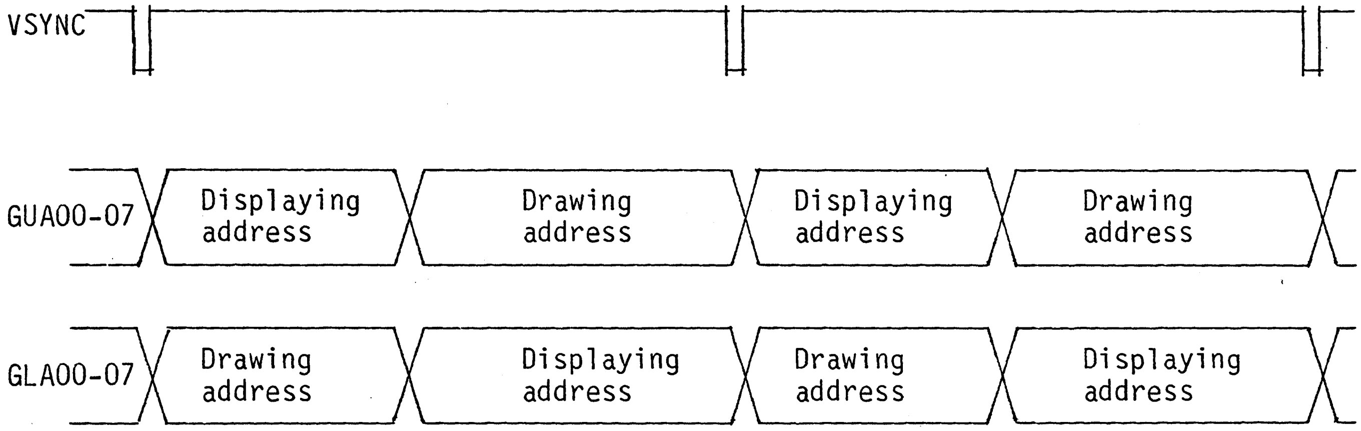
With above procedure one line scanning is made. Every 3M (3MHz clock), address is advanced and address is advance by HSYNC signal to complete one screen scanning.


+5V
74AC299
IC238
10PIN→GND
20PIN→+5V
IC239
74AC299
H/QH
G/QG
F/QF
E/QE
D/QD
C/QC
B/QB
A/QA
QH'
SL
S0
CLR
G1
G2
QA'
S1
SR
MD0
MD1
MD2
MD3
MD4
MD5
MD6
MD7
MD8
MD9
MD10
MD11
MD12
MD13
MD14
MD15
HM534612P-12
IC230
IC231
IC232
IC233
IC234
IC235
IC236
IC237
A0
A1
A2
A3
A4
A5
A6
A7
RAS
CAS
DT/OE
WE
I/O1
I/O2
I/O3
I/O4
SI/O1
SI/O2
SI/O3
SI/O4
SC
SOE
SAS
ASD0
ASD1
ASD2
ASD3
XSE0
XSE1
XSE2
XSE3
XSE4
XSE5
XSE6
XSE7
UA00
UA01
UA02
UA03
UA04
UA05
UA06
UA07
XURAS
XUCAS
XUTR/OE
XUWE/WE
LA00
LA01
LA02
LA03
LA04
LA05
LA06
LA07
XLRAS
XLCAS
XLTR/OE
XLWE/WE
UA00-UA07
URAS/CAS
ASD0-ASD3
LA00-LA07
LRAS/CAS
XSE0-7
SAS0
DOTCLK0
LCW0
DSP1
7-4F
7-9A
6-8A
7-6F
7-9B
6-8B
8-8C
8-8B
8-8C
8-8C
AV
I3-IC
IC230-IC237
Vdd:Pin18
Vss:Pin6

As waveform frame memory must display and draw data simultaneously, one screen is separated into upper half and lower half screen. While one half is drawing (writing data into memory) the other half is displaying (beam scanning on the screen). Therefore, devices are also separated for each half.

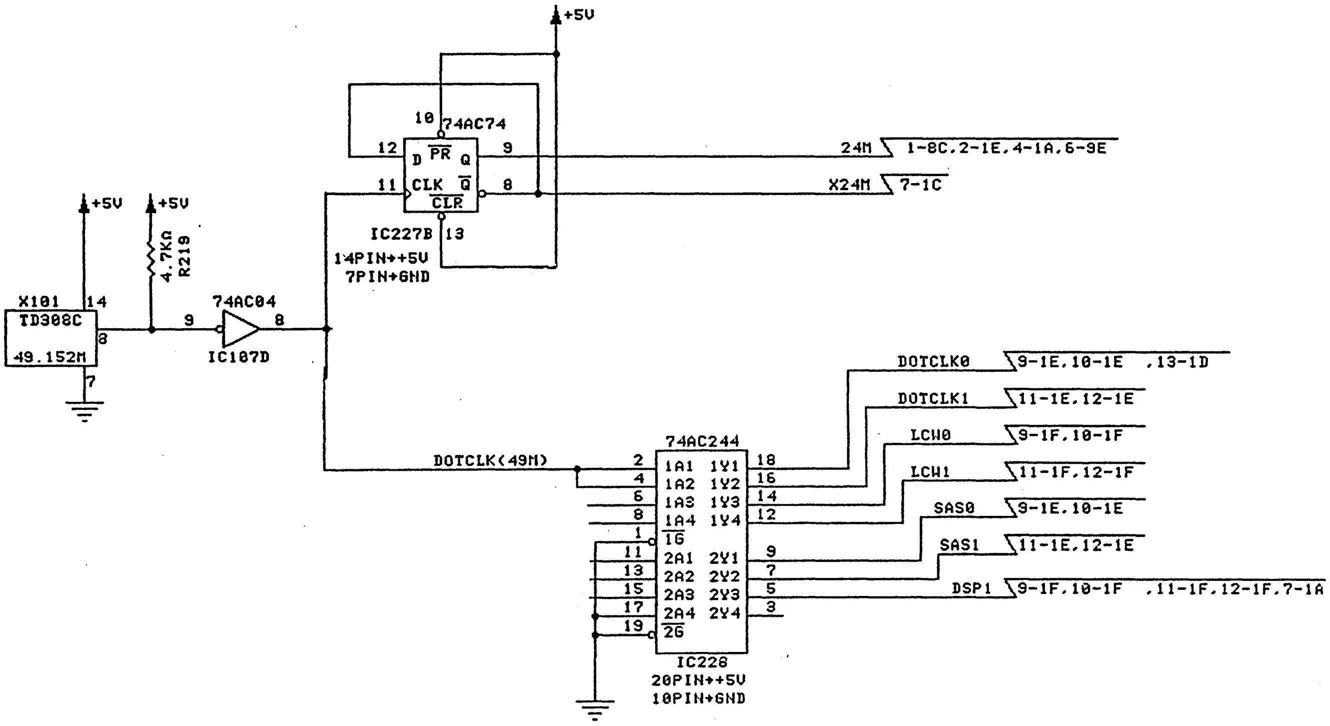
Addresses GUA00- 07 (Upper Address) and GLA00- 07 (Lower Address) switch according to drawing and displaying cycle.


Even field
Odd field
Upper half displaying
Lower half displaying
Lower half drawing
Upper half drawing
Lower half drawing
Upper half drawing
Upper half displaying
Lower half displaying


VSYNC
GUA00-07
Displaying address
Drawing address
Displaying address
Drawing address
GLA00-07
Drawing address
Displaying address
Drawing address
Displaying address

7) Clock oscillation circuit block

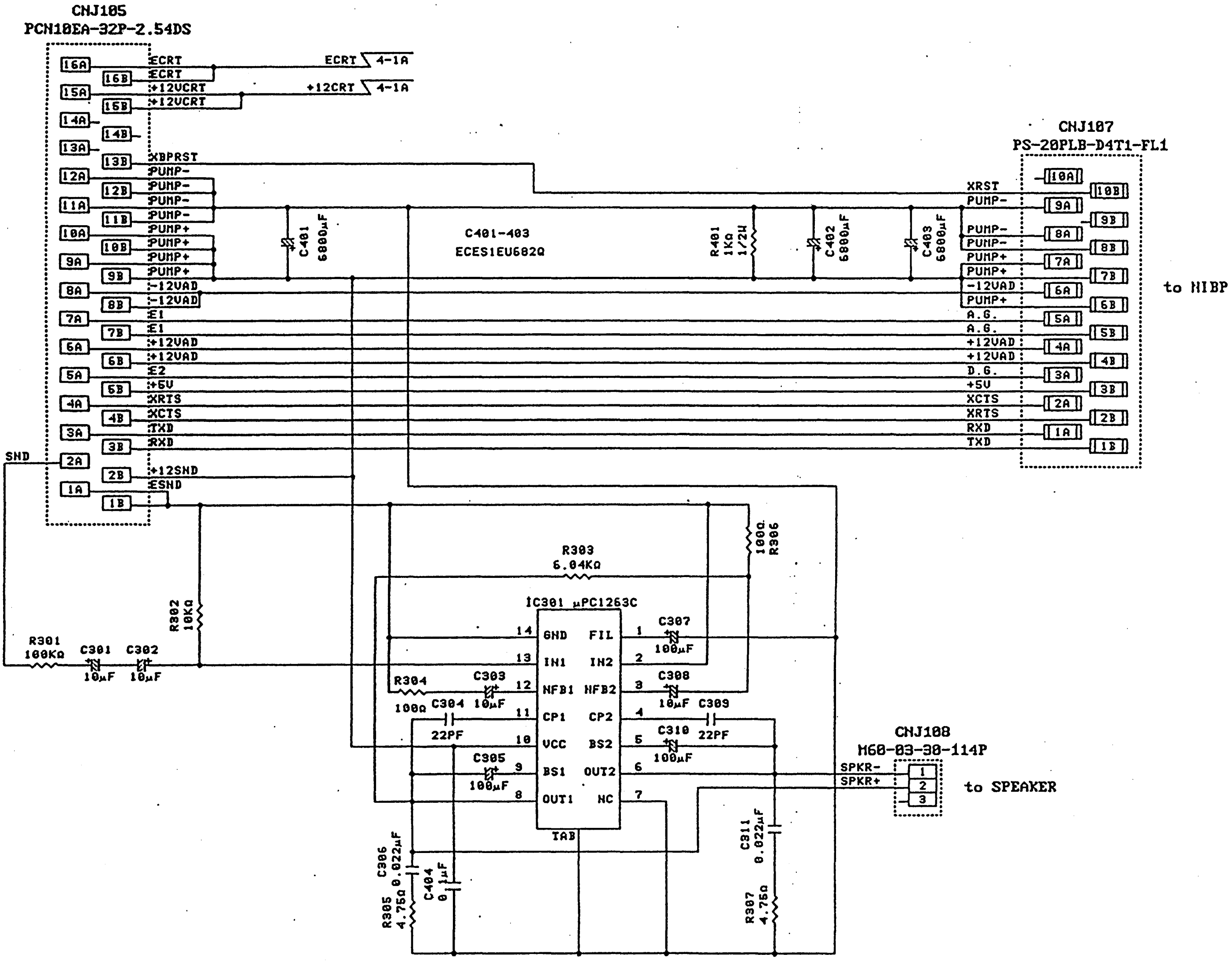
System clock is generated in this circuit block. Original oscillation 49.152MHz is input through buffer to shift register as shift clock. IC227B half divides the original clock into 24.576MHz. This clock is branched to 24M and X24M that are used as system clock in CRTC board and main board (24.576MHz clock is half divided into 12.288MHZ in main board which is used as system clock for main board).


+5V
10
74AC74
12
D
PR
Q
9
11
CLK
Q
8
CLR
IC227B
13
14PIN→+5V
7PIN→GND
24M
1-8C,2-1E,4-1A,6-9E
X24M
7-1C
+5V
+5V
4.7KΩ
R219
X101
14
TD308C
49.152M
8
7
74AC04
9
8
IC107D
DOTCLK0
9-1E,10-1E ,13-1D
DOTCLK1
11-1E,12-1E
LCW0
9-1F,10-1F
LCW1
11-1F,12-1F
SAS0
9-1E,10-1E
SAS1
11-1E,12-1E
DSP1
9-1F,10-1F ,11-1F,12-1F,7-1A
74AC244
DOTCLK(49M)
2
4
6
8
1
11
13
15
17
19
1A1
1A2
1A3
1A4
1G
2A1
2A2
2A3
2A4
2G
1Y1
1Y2
1Y3
1Y4
2Y1
2Y2
2Y3
2Y4
18
16
14
12
9
7
5
3
IC228
20PIN→+5V
10PIN→GND

9) Audio power amplifier circuit block and NIBP line junction block

Approximately 0.3/vp-p QRS synchronized tone or alarm tone from main unit is attenuated with R301 and R302 to 1/10 and then approximately 60 times amplified to a level for speaker. Total amplification is 6 times. IC301 is a stereo amplifier. In this circuit, both channels are connected in bridge and operates in BTL (Balanced Transformer Less) operation to increase output power.

NIBP junction block only passes signals from main board to NIBP unit, however, capacitors are mounted on this part to reduce surge current appearing when NIBP pump starts rotation for cuff inflation.


CNJ105
PCN10EA-32P-2.54DS
16A
16B
15A
15B
14A
14B
13A
13B
12A
12B
11A
11B
10A
10B
9A
9B
8A
8B
7A
7B
6A
6B
5A
5B
4A
4B
3A
3B
2A
2B
1A
1B
ECRT
ECRT
+12VCRT
+12VCRT
XBPRST
PUMP-
PUMP-
PUMP-
PUMP-
PUMP+
PUMP+
PUMP+
PUMP+
-12VAD
-12VAD
E1
E1
+12VAD
+12VAD
E2
+5V
XRTS
XCTS
TXD
RXD
+12SND
ESND
SND
ECRT 4-1A
+12CRT 4-1A
C401
6800μF
C401-403
ECES1EU682Q
R401
1KΩ
1/2W
C402
6800μF
C403
6800μF
CNJ107
PS-20PLB-D4T1-FL1
XRST
PUMP-
PUMP-
PUMP-
PUMP+
PUMP+
-12VAD
PUMP+
A.G.
A.G.
+12VAD
+12VAD
D.G.
+5V
XCTS
XRTS
RXD
TXD
10A
10B
9A
9B
8A
8B
7A
7B
6A
6B
5A
5B
4A
4B
3A
3B
2A
2B
1A
1B
to NIBP
R306
100Ω
R303
6.04KΩ
IC301 μPC1263C
GND
IN1
NFB1
CP1
VCC
BS1
OUT1
FIL
IN2
NFB2
CP2
BS2
OUT2
NC
TAB
14
13
12
11
10
9
8
1
2
3
4
5
6
7
R302
10KΩ
R301
100KΩ
C301
10μF
C302
10μF
R304
100Ω
C303
10μF
C304
22PF
C305
100μF
C307
100μF
C308
10μF
C309
22PF
C310
100μF
C306
0.022μF
R305
4.75Ω
C404
0.1μF
C311
0.022μF
R307
4.75Ω
CNJ108
M60-03-30-114P
SPKR-
SPKR+
1
2
3
to SPEAKER

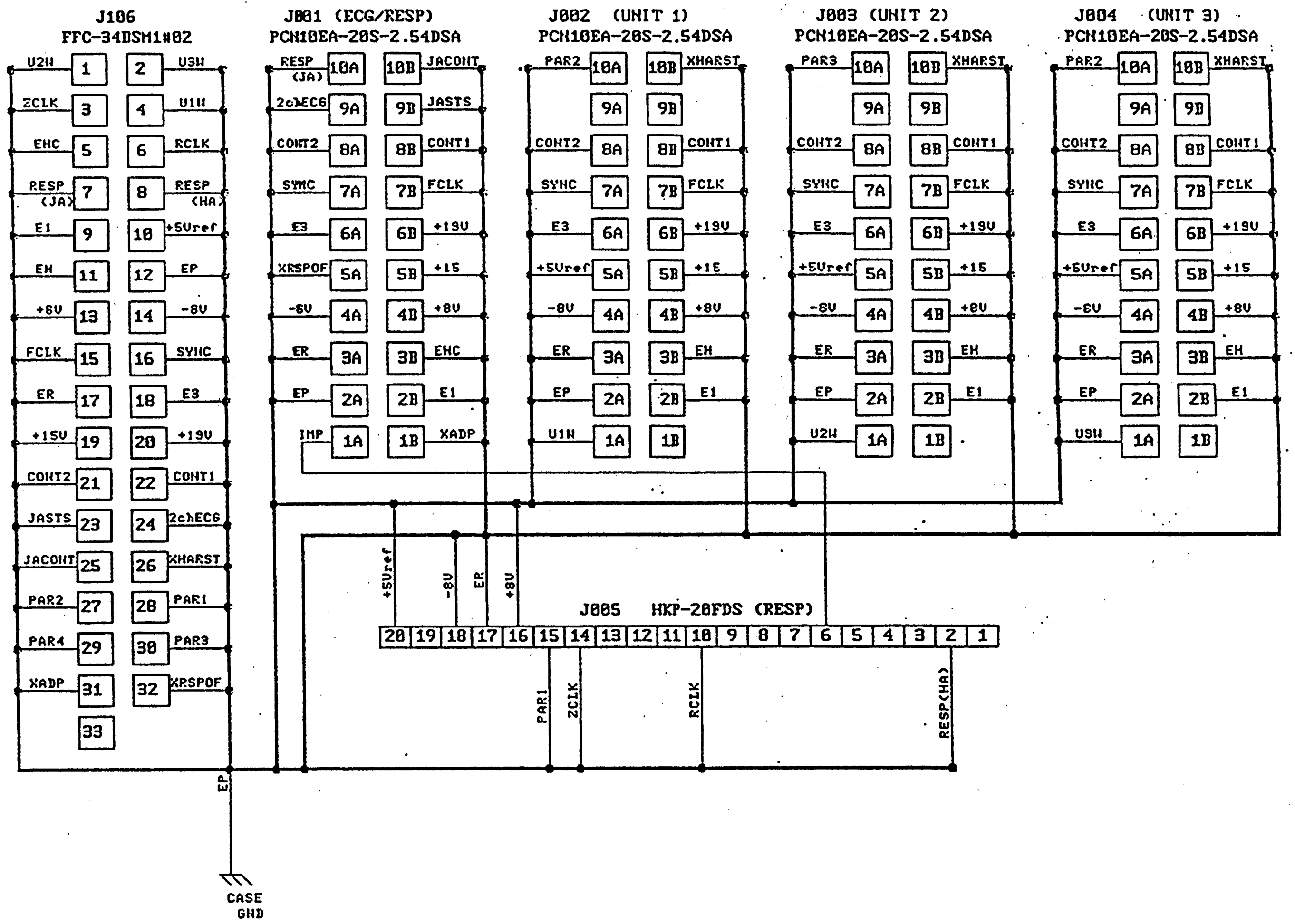
4.2.3 Head amplifier mother board, RESP board and operation boards

Head amplifier mother board gathers signals from the head amplifiers and sends them to the main board. And it transmits and receives data to and from the RESP board. RESP board detects impedance variation between the ECG electrodes to obtain respiration activity. As the ECG/RESP head amplifier is provided with isolation transformers, this circuit is not isolated.

Components on the operation boards are switches, connectors, lamps and volumes that are connected to the main board.

1) Head amplifier mother board UP-0399

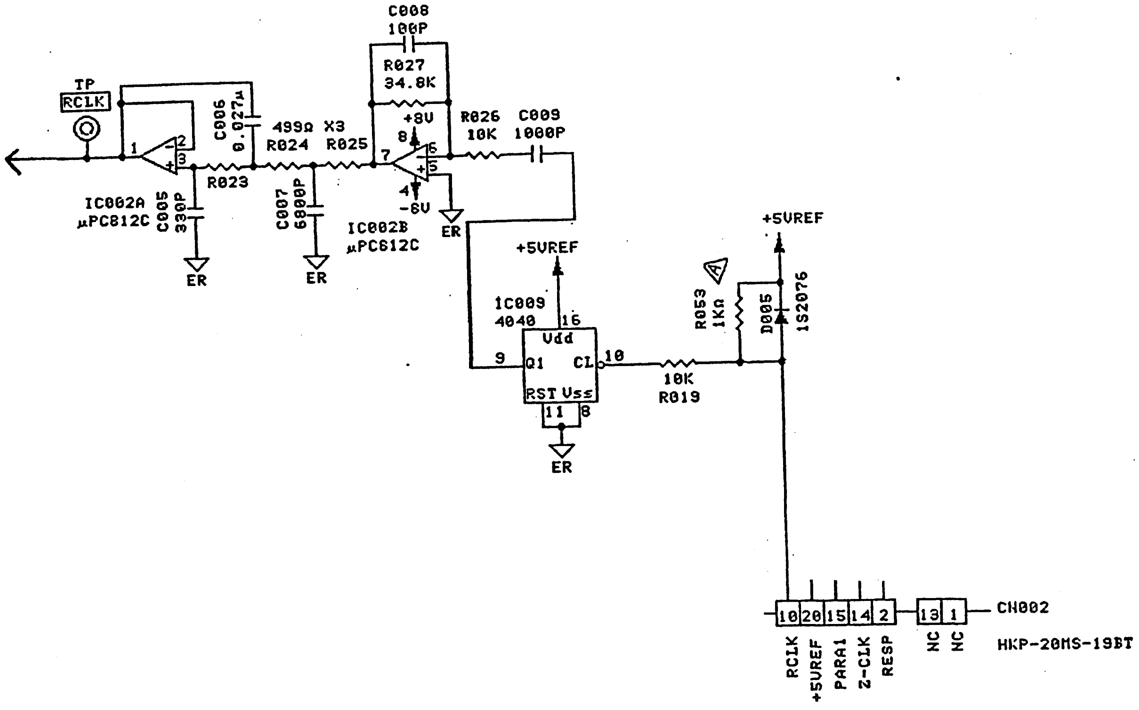
Head amplifier mother board UP-0399 is composed of four connectors J001- J004 for connecting with head amplifiers including ECG/RESP head amplifier, connector J005 for RESP board and connector J106 for the main board. Connector pin assignment of J002- J004 is fully compatible. J001 for ECG/RESP head amplifier has special pin assignment.


J106
FFC-34DSM1#02
U2W 1 2 U3W
ZCLK 3 4 U1W
EHC 5 6 RCLK
RESP (JA) 7 8 RESP (HA)
E1 9 10 +5Vref
EH 11 12 EP
+8V 13 14 -8V
FCLK 15 16 SYNC
ER 17 18 E3
+15V 19 20 +19V
CONT2 21 22 CONT1
JASTS 23 24 2chECG
JACONT 25 26 XHARST
PAR2 27 28 PAR1
PAR4 29 30 PAR3
XADP 31 32 XRSPOF
33
J001 (ECG/RESP)
PCN10EA-20S-2.54DSA
RESP (JA) 10A 10B JACONT
2chECG 9A 9B JASTS
CONT2 8A 8B CONT1
SYNC 7A 7B FCLK
E3 6A 6B +19V
XRSPOF 5A 5B +15
-8V 4A 4B +8V
ER 3A 3B EHC
EP 2A 2B E1
IMP 1A 1B XADP
J002 (UNIT 1)
PCN10EA-20S-2.54DSA
PAR2 10A 10B XHARST
9A 9B
CONT2 8A 8B CONT1
SYNC 7A 7B FCLK
E3 6A 6B +19V
+5Vref 5A 5B +15
-8V 4A 4B +8V
ER 3A 3B EH
EP 2A 2B E1
U1W 1A 1B
J003 (UNIT 2)
PCN10EA-20S-2.54DSA
PAR3 10A 10B XHARST
9A 9B
CONT2 8A 8B CONT1
SYNC 7A 7B FCLK
E3 6A 6B +19V
+5Vref 5A 5B +15
-8V 4A 4B +8V
ER 3A 3B EH
EP 2A 2B E1
U2W 1A 1B
J004 (UNIT 3)
PCN10EA-20S-2.54DSA
PAR2 10A 10B XHARST
9A 9B
CONT2 8A 8B CONT1
SYNC 7A 7B FCLK
E3 6A 6B +19V
+5Vref 5A 5B +15
-8V 4A 4B +8V
ER 3A 3B EH
EP 2A 2B E1
U3W 1A 1B
+5Vref
-8V
ER
+8V
J005 HKP-20FDS (RESP)
20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
PAR1
ZCLK
RCLK
RESP(HA)
EP
CASE
GND

2) RESP board UP-0519

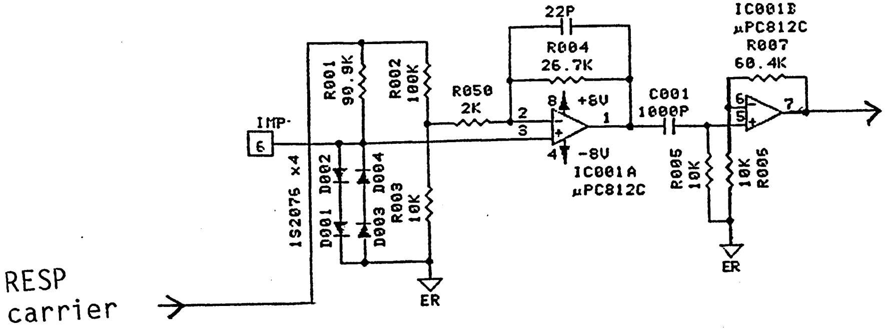
RESP board UP-0519 mounts circuits for respiration detector, carrier signal generator, 20 times gain preamplifier, respiration synchronization detector, 5Hz high-cut filter, auto shift circuit including 91 times gain amplifier, output buffer including 5Hz low-pass filter, and respiration measure on/off control comparator.

In respiration detection carrier generator, 153.6kHz RCLK frequency is divided into 76.8kHz 5Vp-p squarewave, and then filtered by three steps of low-pass filter composed of IC002, R023- R026 and C005- C007 into 10Vp-p 76.8kHz sinewave respiration detection carrier signal.



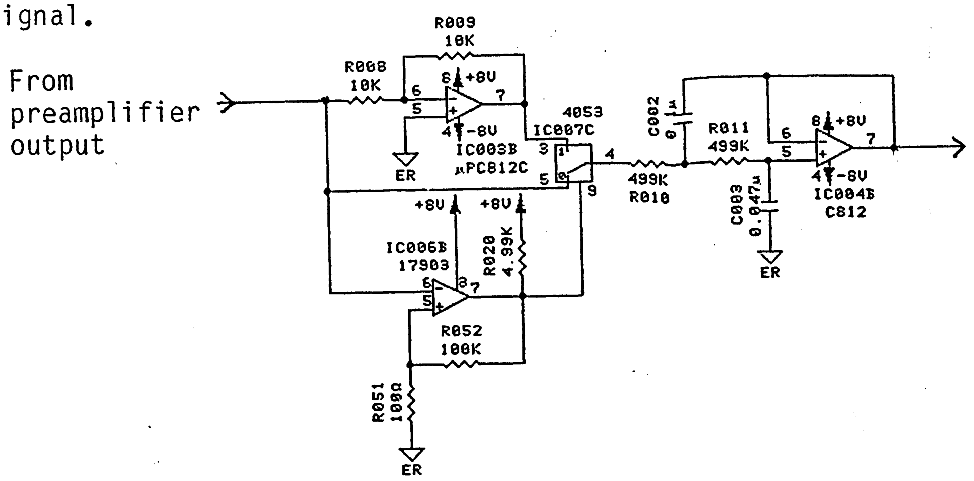
C008
100P
R027
34.8K
TP
RCLK
C006
0.027μ
499Ω X3
R024
R025
+8V
R026
10K
C009
1000P
1
2
3
8
7
6
5
4
-8V
R023
IC002A
μPC812C
C005
330P
C007
6800P
IC002B
μPC812C
ER
ER
ER
ER
+5VREF
+5VREF
IC009
4040
16
Vdd
9
Q1
CL
10
RST Vss
11
8
ER
R053
1KΩ
A
D005
1S2076
10K
R019
10
20
15
14
2
13
1
CN002
RCLK
+5VREF
PARA1
Z-CLK
RESP
NC
NC
HKP-20MS-19BT

Patient circuit composes of a bridge circuit with R001- R003 and impedance of patient's chest. Bridge circuit is excited by respiration detection carrier and imbalance component of the bridge is approximately 20 times amplified by IC001A and IC001B. When impedance of the patient is high, imbalance component of the bridge becomes large and output of preamplifier becomes large. D001- D004 are for protection of the circuit against over input such as defibrillation discharge.

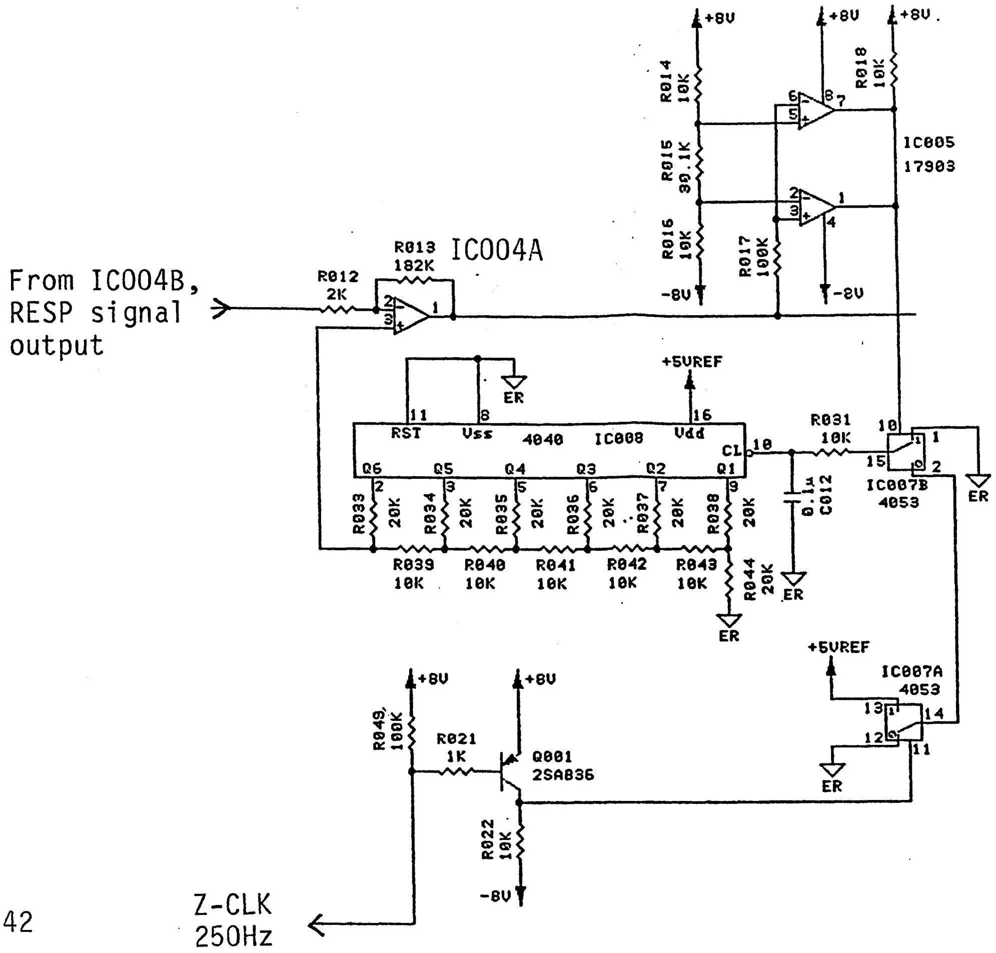


C013
22P
R004
26.7K
IC001B
μPC812C
R007
60.4K
R001
90.9K
R002
100K
R050
2K
8
+8V
2
3
1
C001
1000P
6
5
7
IMP
6
4
-8V
IC001A
μPC812C
R005
10K
10K
R006
1S2076 x4
D001
D002
D003
D004
R003
10K
ER
ER
RESP
carrier

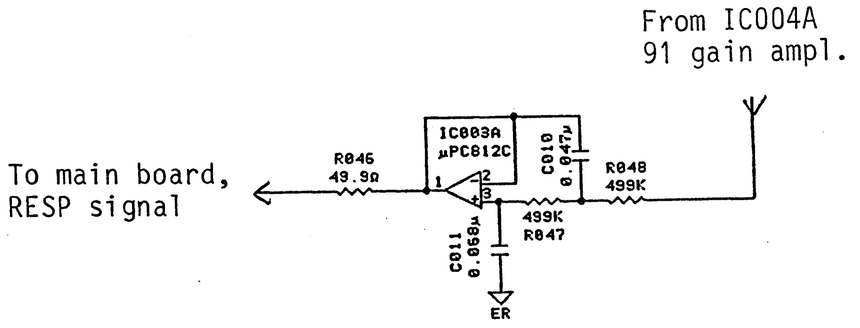
Preamplifier output signal is sent to respiration synchronization detector and low-pass filter. Respiration waveform is full-wave rectified with zero-cross comparator IC006B and analog switch IC007C according to polarity of respiration waveform signal.


From preamplifier output
R009
10K
R008
10K
+8V
-8V
IC003B
μPC812C
ER
4053
IC007C
C002
1μ
R011
499K
499K
R010
C003
0.047μ
IC004B
C812
IC006B
17903
R020
4.99K
R052
100K
R051
100Ω

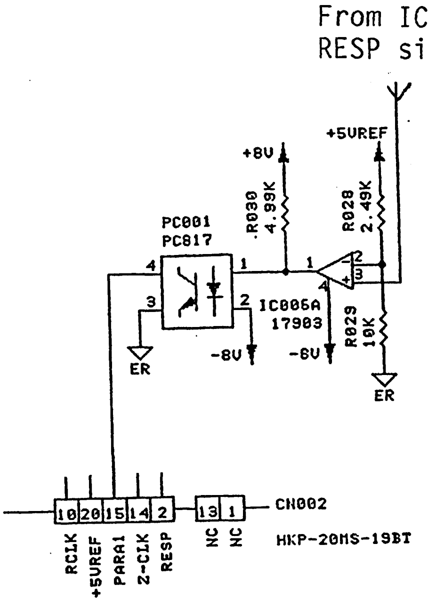
Auto shift circuit block limits amplitude of respiration waveform so that signal does not saturate in the next 91 times gain amplifier. When output of 91 times gain amplifier IC004A is over +4.8V or below -4.8V, comparator IC005 turns to Low and analog switch IC007B is switched to side "0". Then Z-CLK signal (250Hz) is applied to counter IC008 and the counter starts counting. Output of IC008 is D/A converter by R-2R ladder and 0V to 5V staircase waveform is superimposed on the input signal at IC104A to shift output signal. When output voltage returns inside +4.8V and -4.8V comparator output turns to High and stops Z-CLK signal. IC007A is a level shifter device generating 0V- 5V level voltage from 0V- 8V Z-CLK signal.


From IC004B, RESP signal output
R012
2K
R013
182K
IC004A
R014
10K
R015
39.1K
R016
10K
R017
100K
R018
10K
+8V
-8V
IC005
17903
+5VREF
ER
RST
Vss
4040
IC008
Vdd
CL
Q6
Q5
Q4
Q3
Q2
Q1
R033
R034
R035
R036
R037
R038
20K
R039
R040
R041
R042
R043
10K
R044
20K
R031
10K
0.1μ
C012
IC007B
4053
IC007A
4053
R049
100K
R021
1K
Q001
2SA836
R022
10K
Z-CLK
250Hz

IC003A functions as output buffer to the main board and noise component is removed.


From IC004A
91 gain ampl.
To main board,
RESP signal
R046
49.9Ω
IC003A
μPC812C
1
2
3
C010
0.047μ
R048
499K
499K
R047
C011
0.068μ
ER

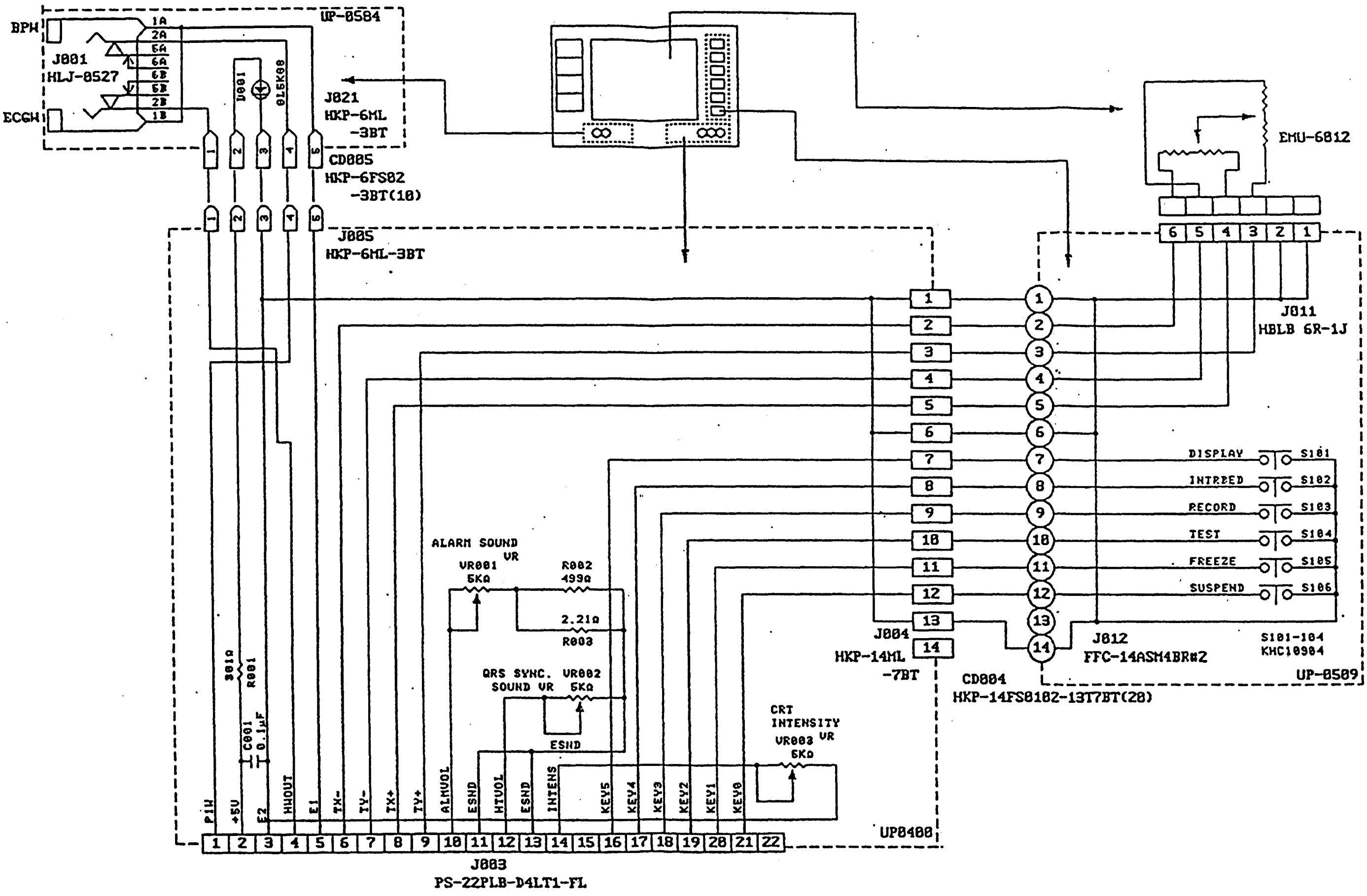
In respiration measuring condition detector, output signal before auto shift circuit is compared with voltage (4.3V) corresponding to 2 kohm impedance by comparator IC006A by using a nature that output signal becomes large when impedance is high. When impedance is low comparator output is Low and PARA1 signal is High. When impedance is high, PARA1 signal is Low to indicate that respiration measurement is off condition. PARA1 signal is indicated with PAR1 in the main board.


From IC004B,
RESP signal
+5VREF
+8V
R030
4.99K
R028
2.49K
PC001
PC817
4
3
1
2
IC006A
17903
-8V
-8V
R029
10K
ER
ER
10
20
15
14
2
13
1
CN002
RCLK
+5VREF
PARA1
Z-CLK
RESP
NC
NC
HKP-20MS-19BT

3) Operation boards UP-0400, UP-0509 and UP-0584

Three operation boards are fixed to front chassis and touch key panel assembly and mounts tone and brightness volumes, push button switches, power indication lamp and ECG1 and BP1 output jacks. At factory set, alarm tone cannot be adjusted fully fadeable but by shortening the jumper line R003 with a wire it can be fully fadeable with the volume on the front (R003 reads 2.21ohm in circuit diagram).

Touch key panel data is sent to main board via UP-0509 and UP-0400.



BPH
ECGH
J001
HLJ-0527
1A
2A
6A
6A
6B
6B
2B
1B
UP-0584
D001
SEL5910
J021
HKP-6ML
-3BT
CD005
HKP-6FS02
-3BT(10)
J005
HKP-6ML-3BT
1
2
3
4
5
EMU-6012
6
5
4
3
2
1
J011
HBLB 6R-1J
DISPLAY
S101
INTRBED
S102
RECORD
S103
TEST
S104
FREEZE
S105
SUSPEND
S106
S101-104
KHC10904
J012
FFC-14ASM4BR#2
UP-0509
J004
HKP-14ML
-7BT
CD004
HKP-14FS0102-13T7BT(20)
ALARM SOUND VR
VR001
5KΩ
R002
499Ω
2.21Ω
R003
QRS SYNC. SOUND VR
VR002
5KΩ
ESND
CRT INTENSITY VR
VR003
5KΩ
301Ω
R001
C001
0.1μF
PIH
+5V
E2
HHOUT
E1
TX-
TY-
TX+
TY+
ALMVOL
ESND
HTVOL
ESND
INTENS
KEY5
KEY4
KEY3
KEY2
KEY1
KEY0
UP0400
J003
PS-22PLB-D4LT1-FL

4.2.4 Power supply SC-006R, SC-006RK

SC-006R/RK supplies power (±8V, ±19V, +5V and +12V) from AC100V- 125V line voltage and SC-006P/RK supplies power from AC220V- 240V. Switching regulation method is used in this power unit to design the unit small and light weight.

Line voltage setting can be set by moving the plug P003 to/from J003 (100V) or J002 (200V).

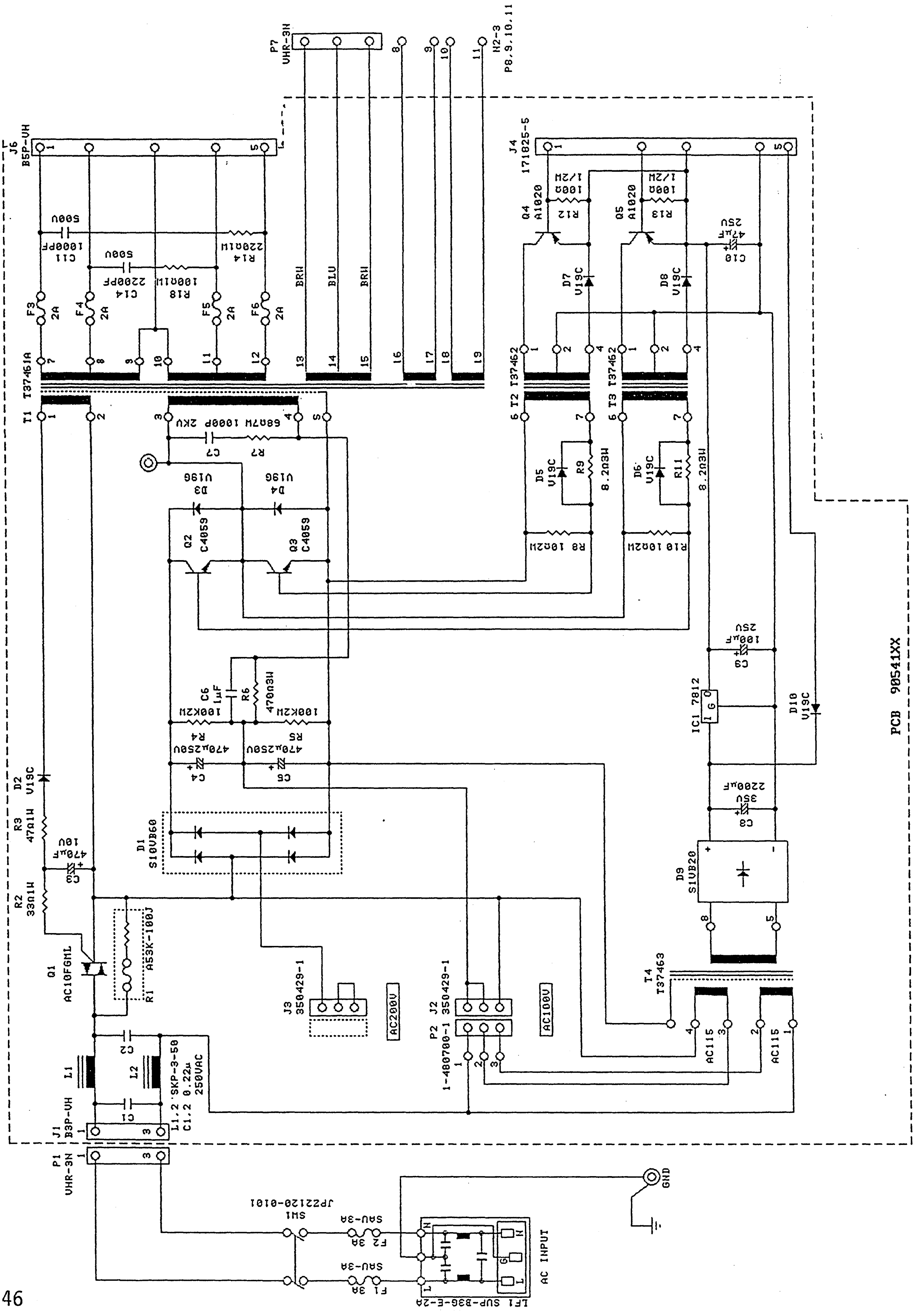
1) Primary circuit

AC line voltage is connected to a surge-current protector composed of Q1 and R1 after passing through line filter, power switch and power fuses. The line voltage is connected to rectifier diode D1, and smoothers C4 and C5 and applied to power transformer T4 in drive circuit. Q2 and Q3 switch rectified DC voltage under control of approximately 24kHz drive transformers T2 and T3.

At secondary circuit of power transformer T4, rectified, smoothed and regulated voltage by D9, C8, and IC1, is connected to drive transisters Q4 and Q5. this power voltage is used at power on to start drive circuit. In stable condition after power on, +19V power voltage is supplied for the drive circuit.

Q1 in surge-current protector circuit is off when power switch is turned R1 to on, and connected with capacitors is limitting large charging current into capacitors. After drive circuit starts switching operation with Q2 and Q3, Q1 turns to on and AC line voltage is directly applied to circuit. Fuse resistor is used for R1 as when Q1 does not turn to on continuously due to drive circuit failure, large power is exhausted. Be sure that R001 must be replaced with a fuse resistor when servicing.

Power supply unit circuit diagram


P7 VHR-3N
N2-3 P8,9,10,11
J6 B5P-VH
J4 171825-5
Q4 A1020
Q5 A1020
R12 100Ω 1/2W
R13 100Ω 1/2W
C10 47µF 25V
C11 1000PF 500V
C14 2200PF 500V
R18 100Ω1W
R14 220Ω1W
F3 2A
F4 2A
F5 2A
F6 2A
BRN
BLU
BRN
D7 V19C
D8 V19C
T1 T37461A
T2 T37462
T3 T37462
C7 1000P 2KV
R7 68Ω7W
D3 V19G
D4 V19G
Q2 C4059
Q3 C4059
D5 V19C
R9 8.2Ω3W
D6 V19C
R11 8.2Ω3W
R8 10Ω2W
R10 10Ω2W
C9 100µF 25V
IC1 7812
D10 V19C
PCB 90541XX
C6 1µF
R6 470Ω3W
R4 100K2W
R5 100K2W
C4 470µ250V
C5 470µ250V
D2 V19C
R3 47Ω1W
C3 470µF 10V
R2 33Ω1W
D1 S10VB60
C8 2200µF 35V
D9 S1VB20
Q1 AC10FGML
R1 A53K-100J
J3 350429-1
J2 350429-1
AC200V
AC100V
P2 1-480700-1
T4 T37463
AC115
AC115
L1
L2
C1
C2
L1,2 SKP-3-50
C1,2 0.22µ 250VAC
J1 B3P-VH
P1 VHR-3N
JP22120-0101
SW1
SAU-3A
F2 3A
SAU-3A
F1 3A
LF1 SUP-B3G-E-2A
AC INPUT
GND

2) Secondary circuit

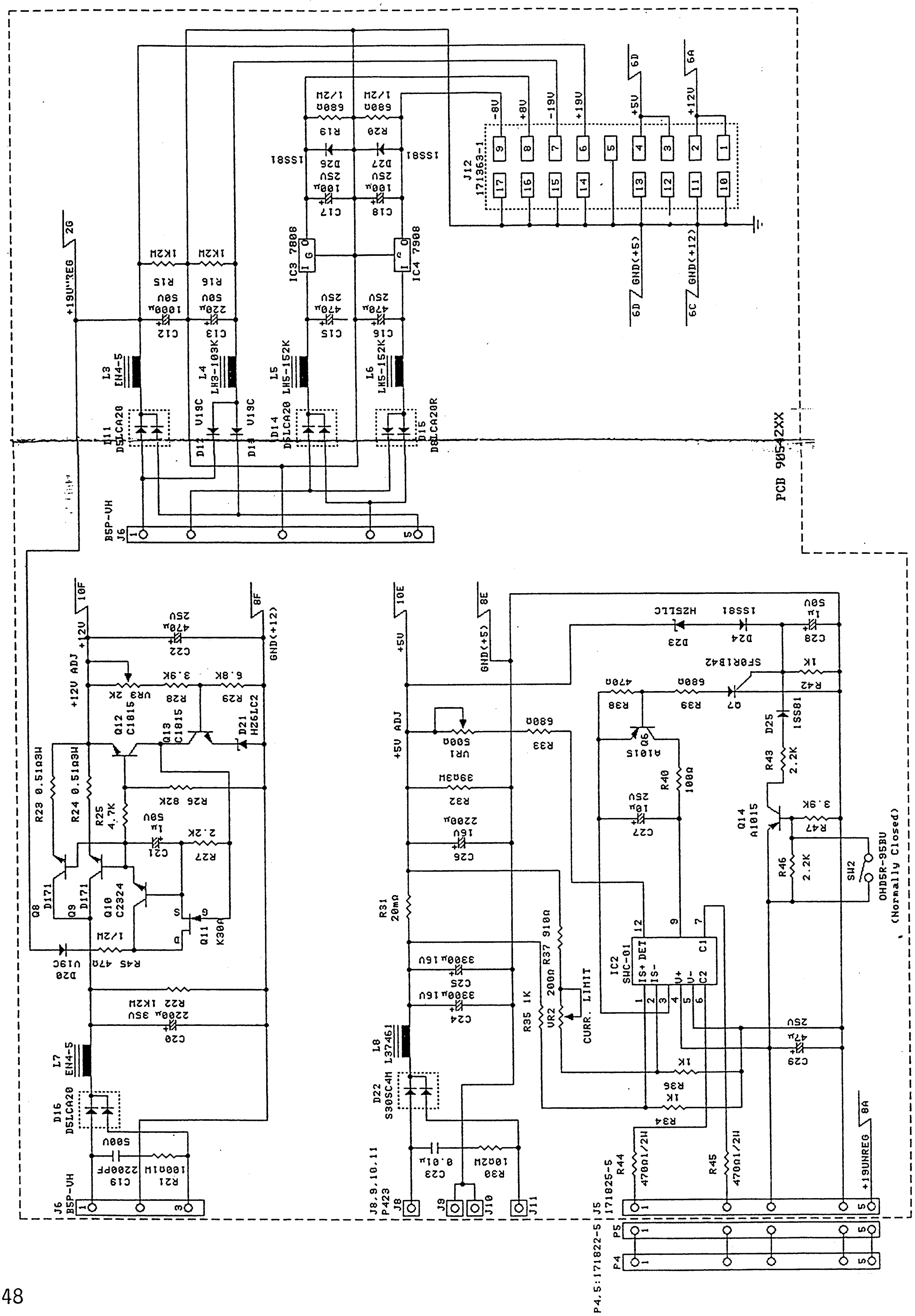
Secondary circuit of transformer T1 is separated into three circuits, ±19V and ±8V (J6) for analog circuits, +5V (P8-11) for digital circuits, and +12V (P6) for CRT unit, NIBP unit and sound board.

Fuses P3- P6 (2A) are inserted into the ±19V and ±8V lines before applying these power line to rectifiers D11- D15, L3- L6, and C12- C16. Fuses are not inserted in the +5V and +12V lines as they are provided with protection circuits in later circuit block.

Rectifiers in the secondary circuits are all choke input type for power efficiency. Rectified ±19V are directly output from the power unit without regulation while ±8V are regulated with IC3 and IC4 three terminal regulators. +12V is obtained by regulating with series regulator composed of transisters Q8- Q12. +12V line is adjusted to +12V ±0.1V with volume VR3. Q12 is used to protect over-current which operates within 3.2A output current.

+5V is the largest power supply in the power unit. This voltage controls Q2 and Q3 switching transisters in the primary switching circuit for power regulation. IC002 controls Q2 and Q3 operation. +5V output voltage is adjusted to +5V ±0.1V with the volume VR1. D23, D26, Q6, and Q7 compose of an over-voltage protector which stops power supply when over-voltage is detected. Thermal switch SW2 and Q14 compose of an over-heat protector which stops power supply when heatsink temperature exceeds 95°C.

Power supply secondary circuit

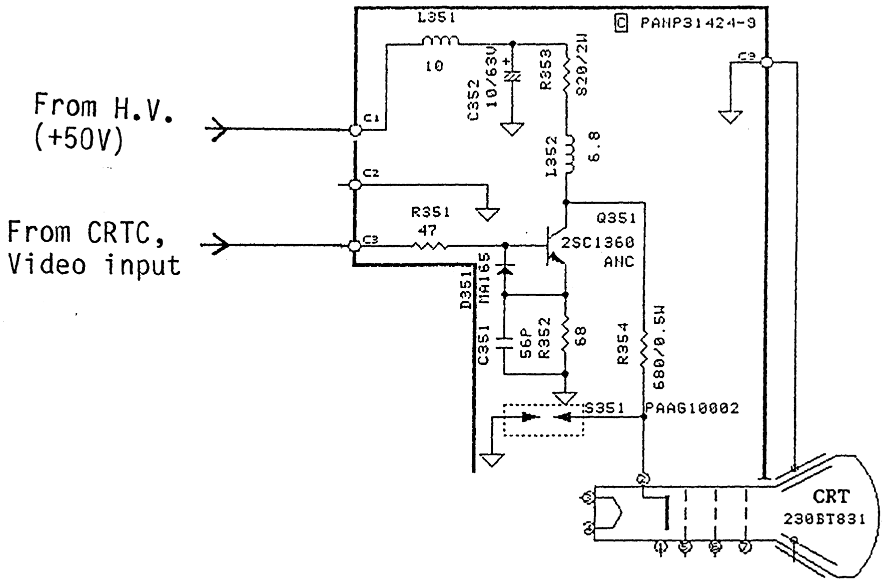

PCB 90542XX
J6 BSP-UH
J12 171963-1
-8V
+8V
-19V
+19V
+5V
+12V
6D
6A
2G
+19V"REG
GND(+5)
GND(+12)
6C
IC3 7808
IC4 7908
L3 EN4-5
L4 LH3-103K
L5 LH5-152K
L6 LH5-152K
D11 D5LCA20
D12 V19C
D13 V19C
D14 D5LCA20
D15 D5LCA20R
C12 1000µ 50V
C13 220µ 50V
R15 1K2W
R16 1K2W
C15 470µ 25V
C16 470µ 25V
C17 100µ 25V
C18 100µ 25V
D26 1SS81
D27 1SS81
R19 680Ω 1/2W
R20 680Ω 1/2W
+12V
10F
GND(+12)
8F
C22 470µ 25V
+12V ADJ
VR3 2K
R28 3.9K
R29 6.8K
Q12 C1815
Q13 C1815
D21 H261C2
R23 0.51Ω3W
R24 0.51Ω3W
R25 4.7K
R26 82K
C21 1µ 50V
R27 2.2K
Q8 D171
Q9 D171
Q10 C2324
Q11 K30A
R45 47Ω 1/2W
D20 V19C
R22 1K2W
C20 2200µ 35V
L7 EN4-5
D16 D5LCA20
C19 2200PF 500V
R21 100Ω1W
+5V
10E
GND(+5)
8E
+5V ADJ
VR1 500Ω
R33 680Ω
R32 390Ω3W
C26 2200µ 16V
R31 20mΩ
C25 3300µ16V
C24 3300µ16V
L8 137461
D22 S30SC4M
C23 0.01µ
R30 10Ω2W
J8.9.10.11 P423
J8
J9
J10
J11
R35 1K
VR2 200Ω
R37 910Ω
CURR. LIMIT
IC2 SHC-01
IS+ DET
IS-
V+
V-
C2
C1
R34 1K
R36 1K
C29 47µ 25V
R44 470Ω1/2W
R45 470Ω1/2W
J5 171825-5
+19VUNREG
8A
D23 HZ5LLC
D24 1SS81
C28 1µ 50V
Q7 SF0R1B42
R38 470Ω
R39 680Ω
R42 1K
D25 1SS81
Q6 A1015
R40 100Ω
C27 10µ 25V
R43 2.2K
Q14 A1015
R47 3.9K
R46 2.2K
SH2
OHD5R-95BV
(Normally Closed)
P5
P4
P4.5:171822-5

4.2.5 CRT unit VM-004P

CRT unit VM-004P receives synchronization signal and video signal from the CRTC board and displays on the screen. Screen brightness control is done by the volume on the front of the bedside monitor and the SUB-BRIGHT volume on the CRTC board.

1) Video signal circuit

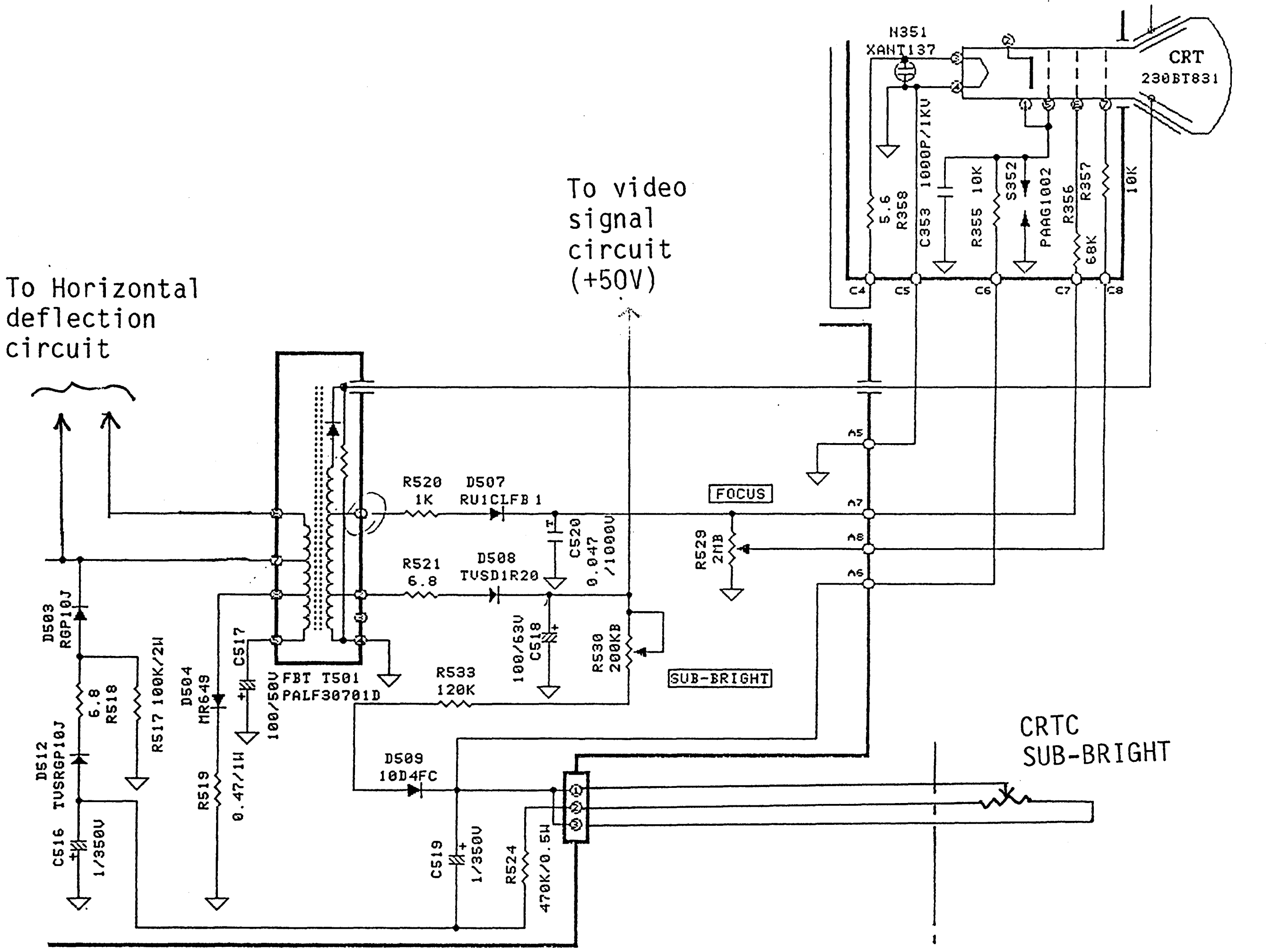
Video signal from the CRTC board is input to the video signal amplifier on the board mounted on the neck of the CRT through the input connector. Video signal is approximately 12 times invertedly amplified and drives CRT cathode. R353 is metal oxide film resistor for heat tolerance due to large power exhaust in the resistor.


From H.V.
(+50V)
From CRTC,
Video input
L351
10
C352
10/63V
R353
820/2W
L352
6.8
PANP31424-9
C1
C2
C3
R351
47
Q351
2SC1360
ANC
D351
MA165
C351
56P
R352
68
R354
680/0.5W
S351
PAAG10002
CRT
230BT831

1) CRT and peripherals

Electron beam controlled by bias voltage between the 1st grid voltage and video signal voltage illuminates fluorecent screen of the CRT. By shifting 1st grid voltage, overall screen brightness can be controlled. SUB-BRIGHT adjustement with R530 is to determine the first grid voltage for CRT biasing. This volume is used to limit maximum brightness to gether is the SUB-BRIGHT volume mounted on the CRTC board. Charge circuit composed of C519, R524, R518, and D510 is a spot killer which prevents electron beam focusing at the center of the screen at power off which will burn fluorecent material.

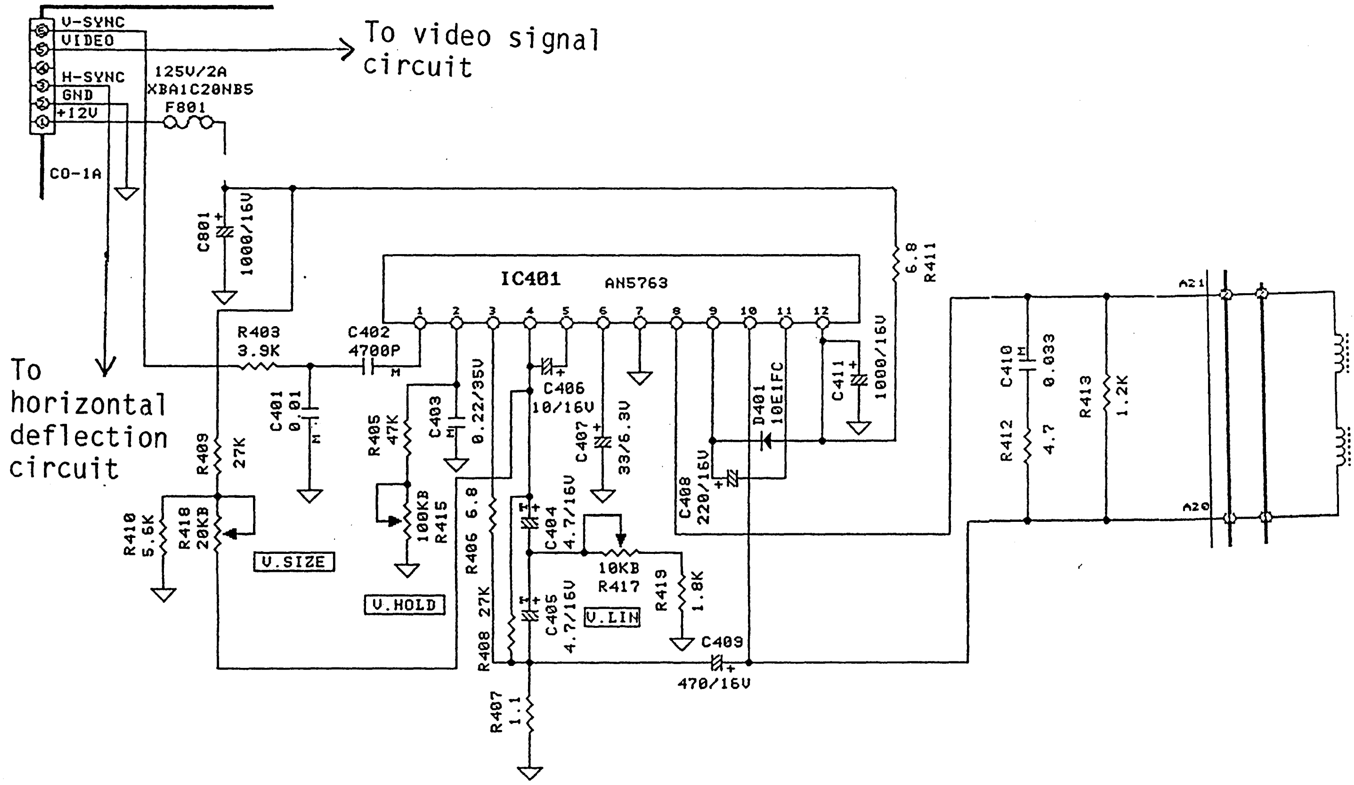
4th grid controls focusing of the screen.



N351
XANT137
CRT
230BT831
5.6
R358
C353 1000P/1KV
R355 10K
S352
PAAG1002
R356
68K
R357
10K
C4
C5
C6
C7
C8
To video signal circuit (+50V)
To Horizontal deflection circuit
A5
A7
A8
A6
R520 1K
D507 RU1CLFB 1
C520 0.047 /1000V
FOCUS
R529 2MB
R521 6.8
D508 TVSD1R20
100/63V C518
R530 200KB
SUB-BRIGHT
D503 RGP10J
6.8 R518
R517 100K/2W
D504 MR649
C517
100/50V
FBT T501 PALF30701D
R533 120K
D512 TVSRGP10J
C516 1/350V
R519
0.47/1W
D509 10D4FC
C519
1/350V
R524
470K/0.5W
CRTC SUB-BRIGHT

2) Vertical deflection circuit

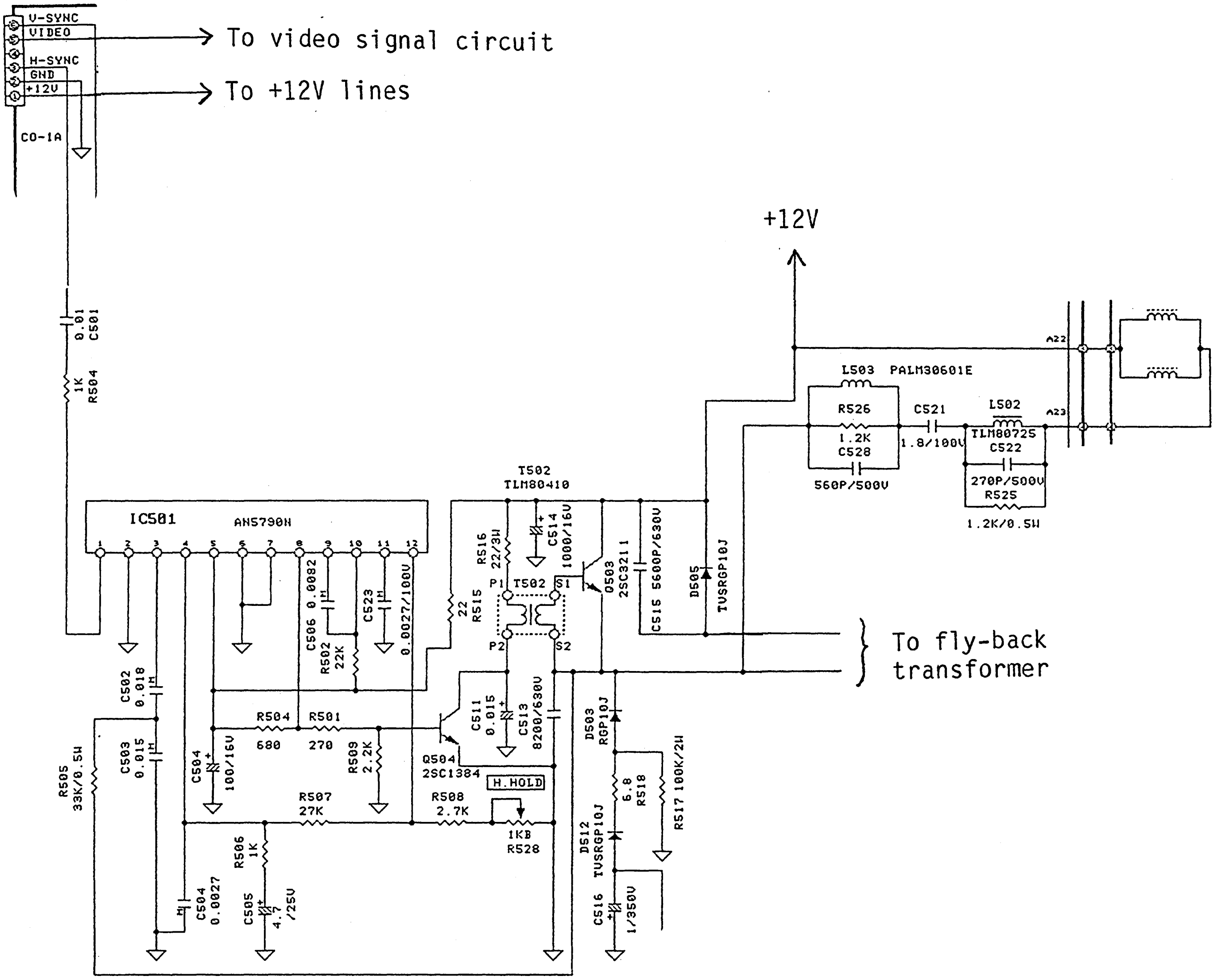
Vertical synchronization signal is input to IC401 pin-1 and controls ON/OFF of charge/discharge circuit composed of C403, R405, and R416 to generate approximately 62kHz sawtooth voltage. VR416 adjusts time constant to synchronize vertically. This sawtooth voltage drives vertical deflection yoke to vertically deflect electron beam VR417 adjusts vertical linearity and VR418 adjusts vertical amplitude.


V-SYNC
VIDEO
H-SYNC
GND
+12V
CO-1A
To video signal circuit
125V/2A
XBA1C20NB5
F801
To horizontal deflection circuit
C801
1000/16V
IC401
AN5763
1
2
3
4
5
6
7
8
9
10
11
12
R411
6.8
R403
3.9K
C402
4700P
M
C401
0.01
M
R409
27K
R405
47K
C403
M
0.22/35V
C406
10/16V
C407
33/6.3V
D401
10E1FC
C411
1000/16V
C408
220/16V
R410
5.6K
R418
20KB
V.SIZE
100KB
R415
V.HOLD
R406
6.8
C404
4.7/16V
10KB
R417
R419
1.8K
V.LIN
R408
27K
C405
4.7/16V
C409
470/16V
R407
1.1
C410
M
0.033
R412
4.7
R413
1.2K
A21
A20

3) Horizontal deflection circuit

Sawtooth voltage is generated by charge/discharge circuit composed of C506, C523, R508 and R528. The frequency is automatically controlled with AFC (Automatic Frequency Control) circuit to 24.6kHz which is synchronized with horizontal synchronization signal. Driver Q504 drives horizontal output transister Q503 via T502 to operate horizontal deflection circuit and high voltage circuit.

L502 inserted in series to deflection yoke is for horizontal width adjustment and L503 and C521 are for fine linearity adjustment.

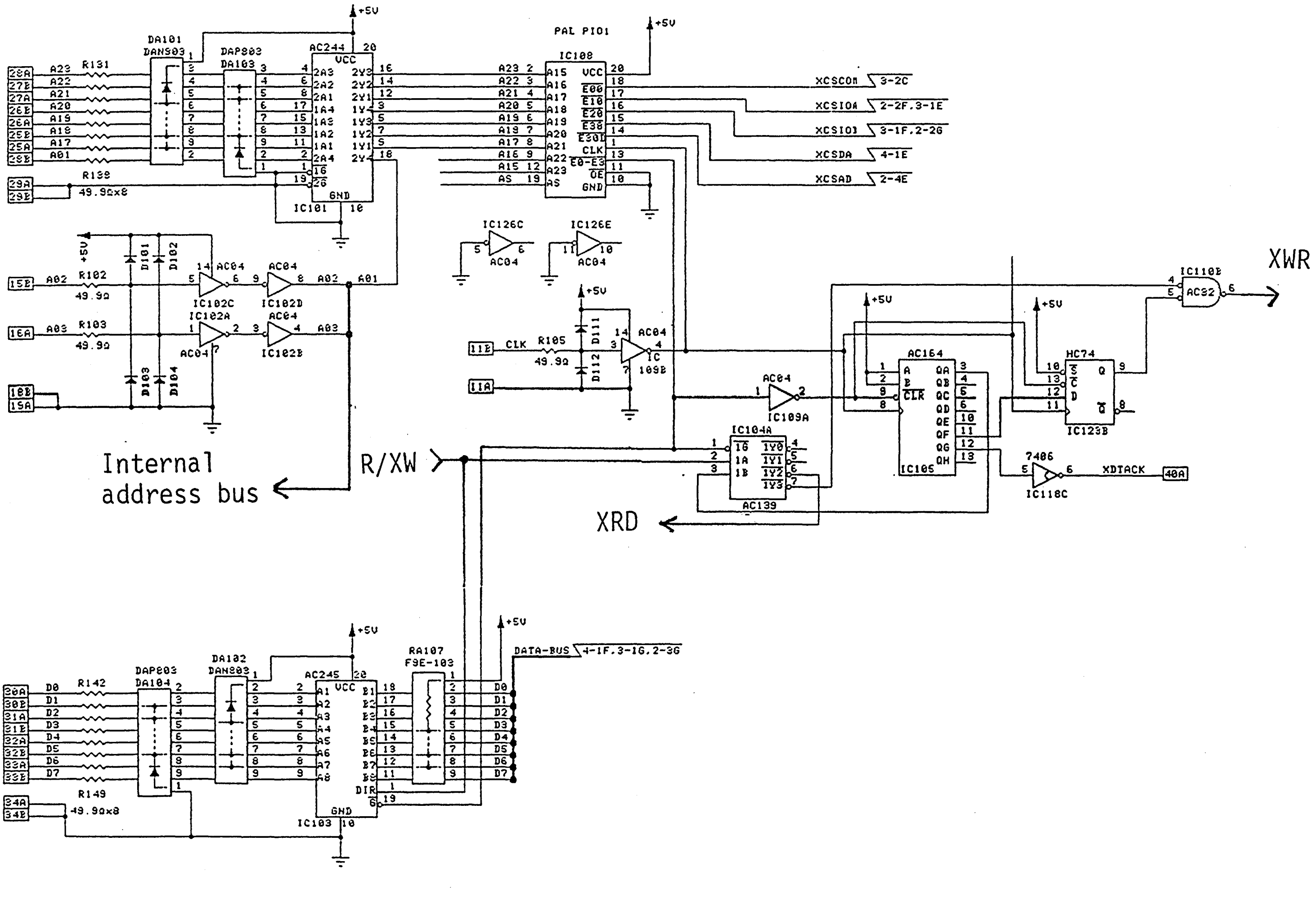

V-SYNC
VIDEO
H-SYNC
GND
+12V
CO-1A
To video signal circuit
To +12V lines
+12V
C501 0.01
R504 1K
IC501
AN5790N
1 2 3 4 5 6 7 8 9 10 11 12
C502 0.018
C503 0.015
R505 33K/0.5W
C504 100/16V
R504 680
R501 270
C506 0.0082
R502 22K
C523
0.0027/100V
R509 2.2K
R507 27K
R506 1K
C504 0.0027
C505 4.7 /25V
Q504 2SC1384
H.HOLD
R508 2.7K
1KB R528
R515 22
R516 22/3W
C514 1000/16V
T502 TLM80410
P1 T502 S1
P2 S2
Q503 2SC3211
C511 0.015
C513 8200/630V
C515 5600P/630V
D505 TVSRGP10J
D503 RGP10J
R518 6.8
R517 100K/2W
D512 TVSRGP10J
C516 1/350V
L503 PALM30601E
R526 1.2K
C528 560P/500V
C521 1.8/100V
L502 TLM80725
C522 270P/500V
R525 1.2K/0.5W
A22
A23
To fly-back transformer

4.2.6 Central monitor interface unit QI-814P

This unit is required to connect the bedside monitor with OGP-7000 or CNS-8200 series central monitor. The unit provides AUX connector for external signal input such as CO2 data from OIR-7101/A CO2 monitor.

1) CPU interface circuit block

This block is assigned to I/O address E00XXXH- E38XXXH and IC108 generates chip select signal for each device on the PC board when the address area is accessed. Lower address A01- 03 is used for central communication register selection and A/D converter register address. On the other hand, data bus is connected to internal bus via bus buffer. DTACK signal to CPU is output from IC108 which is delayed by 24MHz system clock. XWR signal is output from IC123B which is delayed to coincide timing of A/D conversion operation.

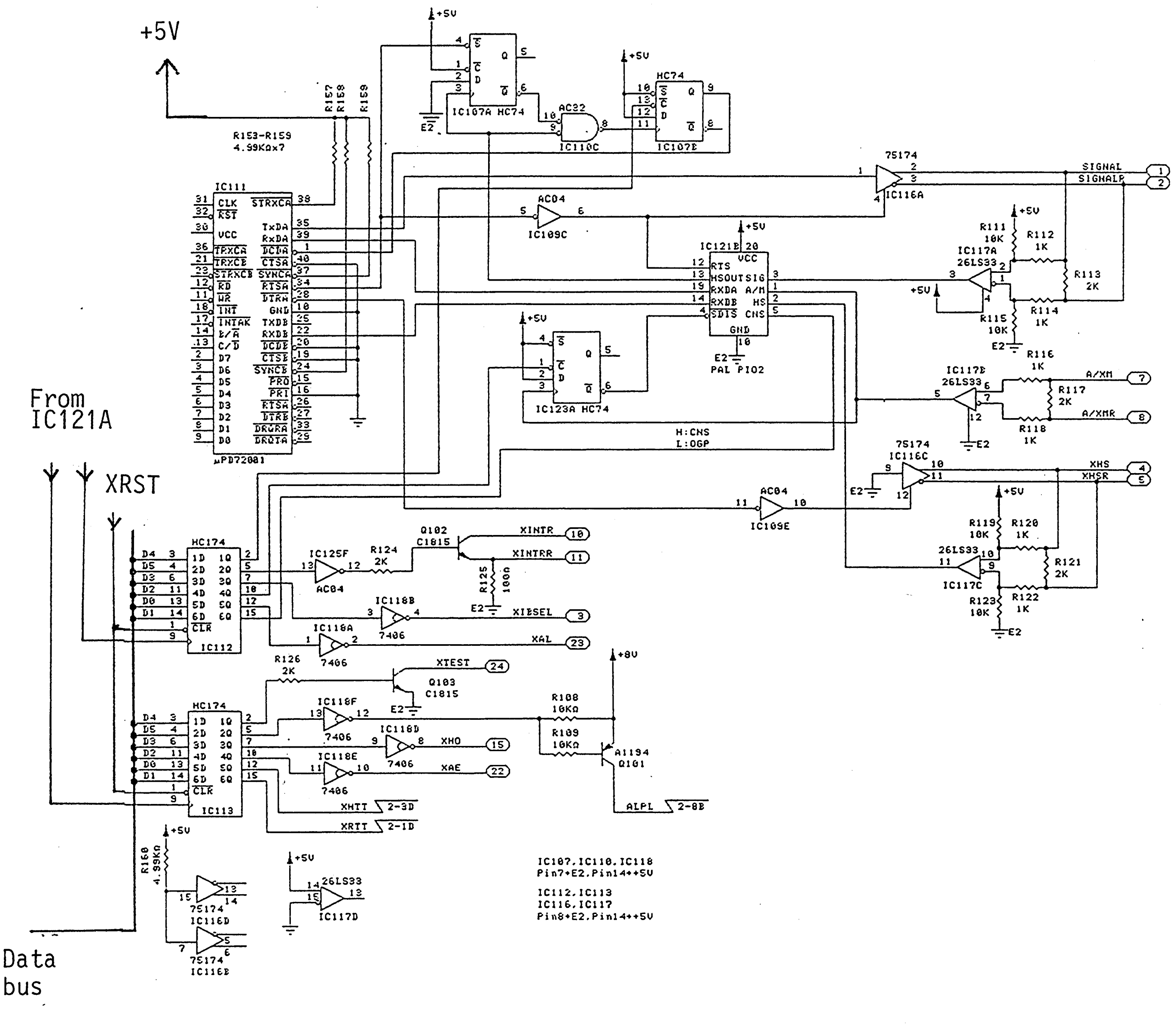


+5V
DA101
DAN803
DAP803
DA103
AC244
IC101
R131
R139
49.9Ωx8
PAL PI01
IC108
XCSCOM 3-2C
XCSIOA 2-2F.3-1E
XCSIO1 3-1F.2-2G
XCSDA 4-1E
XCSAD 2-4E
IC126C
IC126E
AC04
IC102C
IC102D
IC102A
IC102B
R102
R103
49.9Ω
D101
D102
D103
D104
A02
A03
A01
CLK
R105
D111
D112
IC109B
IC109A
AC164
IC105
HC74
IC123B
IC110B
AC32
XWR
IC104A
AC139
7406
IC118C
XDTACK
40A
Internal address bus
R/XW
XRD
DAP803
DA104
DA102
DAN803
AC245
IC103
R142
R149
49.9Ωx8
RA107
F9E-103
DATA-BUS 4-1F.3-1G.2-3G
D0
D1
D2
D3
D4
D5
D6
D7

2) Central communication circuit block

Numerical value and status signal communication is done in digital and waveforms are sent to central monitor in analog. IC111 serial communication controller converts parallel data into serial to be transmitted to central monitor and converts serial data of the central monitor into parallel and transmits to CPU.

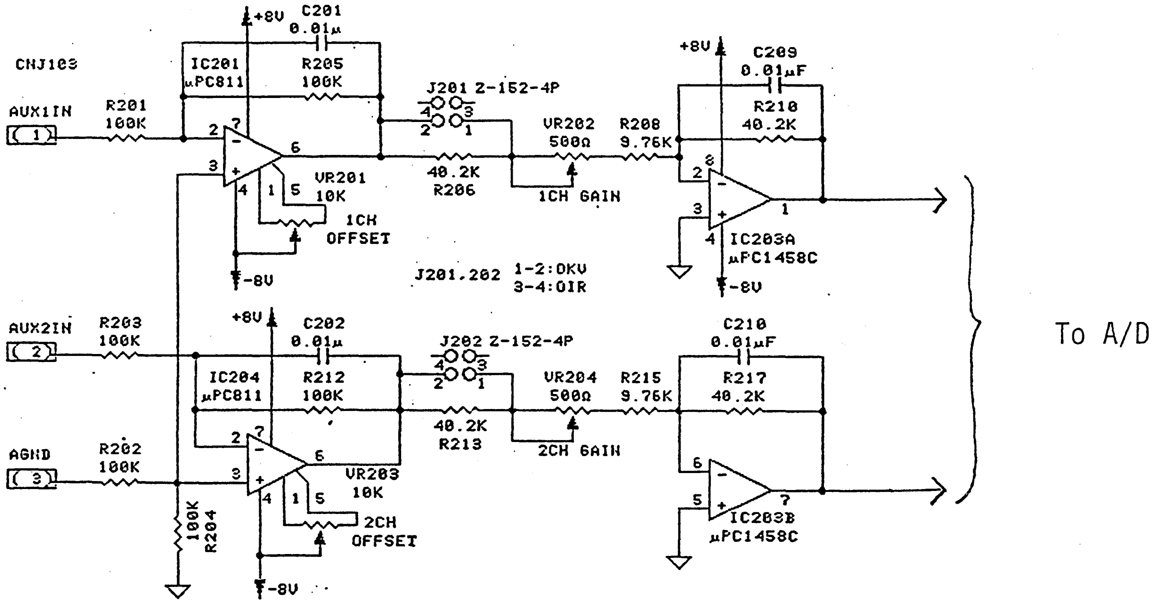
IC107, IC106, IC117, IC123A, and IC121B compose of an I/O interface to arrange communication protocol according to OGP or CNS communciation. IC121B switches the protocol. Output data from IC111 is transferred to SIGNAL line in both OGP and CNS communication protocol and input data from SIGNAL line is input to RxDA when OGP at ADDRESS and is input to RxDB at MESSAGE. XHS signal input to DCDA via IC121B, IC107, and IC110C. Output is done by control of DTRA. When CNS communication protocol, input data from A/XM line is input to RxDA. IC112 and IC113 compose of latch circuit which drives status signals XAL, XAE, XHO, and XTEST and an alarm pole (optional alarm indicator pole used for neonatal monitors) and handles QRS and respiration synchronized signals.


+5V
From IC121A
XRST
Data bus
R153-R159 4.99KΩx7
R157 R158 R159
IC111 µPD72001
CLK RST VCC TRXCA TRXCB STRXCB RD WR INT INTAK B/A C/D D7 D6 D5 D4 D3 D2 D1 D0
STRXCA TxDA RxDA DCDA CTSA SYNCA RTSA DTRA GND TXDB RXDB DCDB CTSB SYNCB PRO PRI RTSA DTRB DRQRA DRQTA
IC107A HC74
AC32 IC110C
HC74 IC107B
AC04 IC109C
IC121B PAL PI02
RTS HSOUT SIG RXDA A/M RXDB HS SDIS CNS VCC GND
IC123A HC74
H:CNS
L:OGP
75174 IC116A
SIGNAL
SIGNALP
IC117A 26LS33
R111 10K
R112 1K
R113 2K
R114 1K
R115 10K
IC117B 26LS33
R116 1K
R117 2K
R118 1K
A/XM
A/XMR
75174 IC116C
XHS
XHSR
AC04 IC109E
R119 10K
R120 1K
R121 2K
R122 1K
R123 10K
26LS33 IC117C
HC174 IC112
HC174 IC113
1D 2D 3D 4D 5D 6D CLR 1Q 2Q 3Q 4Q 5Q 6Q
IC125F AC04
R124 2K
Q102 C1815
XINTR
XINTRR
R125 100Ω
IC118B 7406
XIBSEL
IC118A 7406
XAL
R126 2K
Q103 C1815
XTEST
IC118F 7406
IC118D 7406
XHO
IC118E 7406
XAE
R108 10KΩ
R109 10KΩ
A1194 Q101
+8V
XHTT 2-3D
XRTT 2-1D
ALPL 2-8B
R160 4.99KΩ
75174 IC116D
75174 IC116B
26LS33 IC117D
E2
+5V
IC107.IC110.IC118
Pin7+E2.Pin14++5V
IC112.IC113
IC116.IC117
Pin8+E2.Pin14++5V

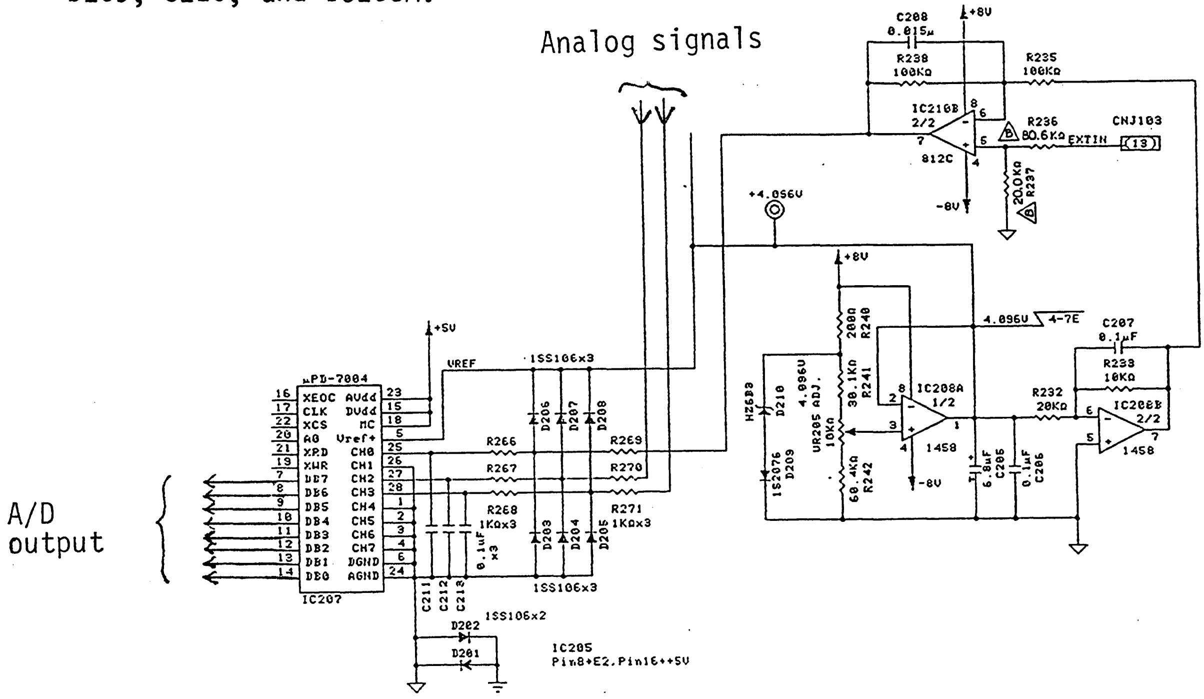
3) AUX input circuit block

This circuit block handles external input signals. CO2 and tcPCO2/tcPCO2 signals are differentially amplified by IC201 and IC202 to remove external noise. ETCO2 and instCO2 data level from OIR is 40mmHg/1V and tcPO2/tcPCO2 data level from OKV (for Japanese market only) is 100mmHg/0.1V. Jumper J201 and J202 are for selection of signal level. Change short circuit plug according to external instrument (factory set is 40mmHg/1V for CO2 data input).

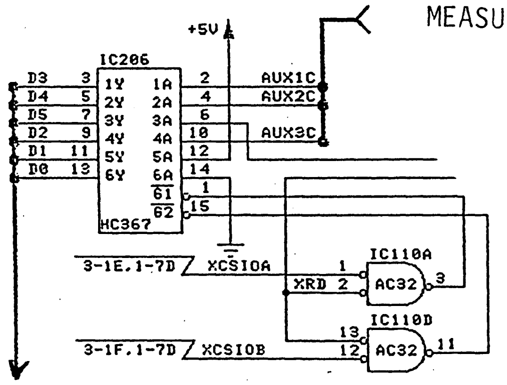
When connecting OKV for tcPO2/tcPCO2 data input, offset adjustment is required (see section for adjustment).


CNJ103
AUX1IN
1
R201
100K
IC201
μPC811
+8V
C201
0.01μ
R205
100K
-8V
VR201
10K
1CH
OFFSET
J201 Z-152-4P
R206
40.2K
VR202
500Ω
R208
9.76K
1CH GAIN
J201.202
1-2:OKV
3-4:OIR
+8V
C209
0.01μF
R210
40.2K
IC203A
μPC1458C
-8V
AUX2IN
2
R203
100K
AGND
3
R202
100K
R204
100K
IC204
μPC811
C202
0.01μ
R212
100K
VR203
10K
2CH
OFFSET
J202 Z-152-4P
R213
40.2K
VR204
500Ω
R215
9.76K
2CH GAIN
C210
0.01μF
R217
40.2K
IC203B
μPC1458C
To A/D

Universal waveform input (WAVE selection on the SETUP screen) is added with offset voltage from IC207 D/A converter to shift waveform level and A/D converted for screen display. Reference voltage 4.096V for A/D conversion is obtained with D209, S210, and IC208A.


Analog signals
A/D output
C208
0.015μ
+8V
R238
100KΩ
R235
100KΩ
IC210B
2/2
812C
R236
80.6KΩ
EXTIN
CNJ103
13
R237
20.0KΩ
-8V
+4.096V
+8V
R240
200Ω
R241
30.1KΩ
VR205 ADJ.
4.096V
10KΩ
R242
60.4KΩ
HZ6B3
D210
1S2076
D209
IC208A
1/2
1458
-8V
C205
6.8μF
C206
0.1μF
4.096V
4-7E
C207
0.1μF
R233
10KΩ
R232
20KΩ
IC208B
2/2
1458
+5V
VREF
1SS106x3
μPD-7004
XEOC
CLK
XCS
A0
XRD
XWR
DB7
DB6
DB5
DB4
DB3
DB2
DB1
DB0
AVdd
DVdd
NC
Vref+
CH0
CH1
CH2
CH3
CH4
CH5
CH6
CH7
DGND
AGND
IC207
D206
D207
D208
R266
R267
R268
1KΩx3
R269
R270
R271
1KΩx3
D203
D204
D205
0.1μF x3
C211
C212
C213
1SS106x3
1SS106x2
D202
D201
IC205
Pin8→E2.Pin16→+5V

Logical signal such as measuring condition indication signal is transferred to system bus via IC206.

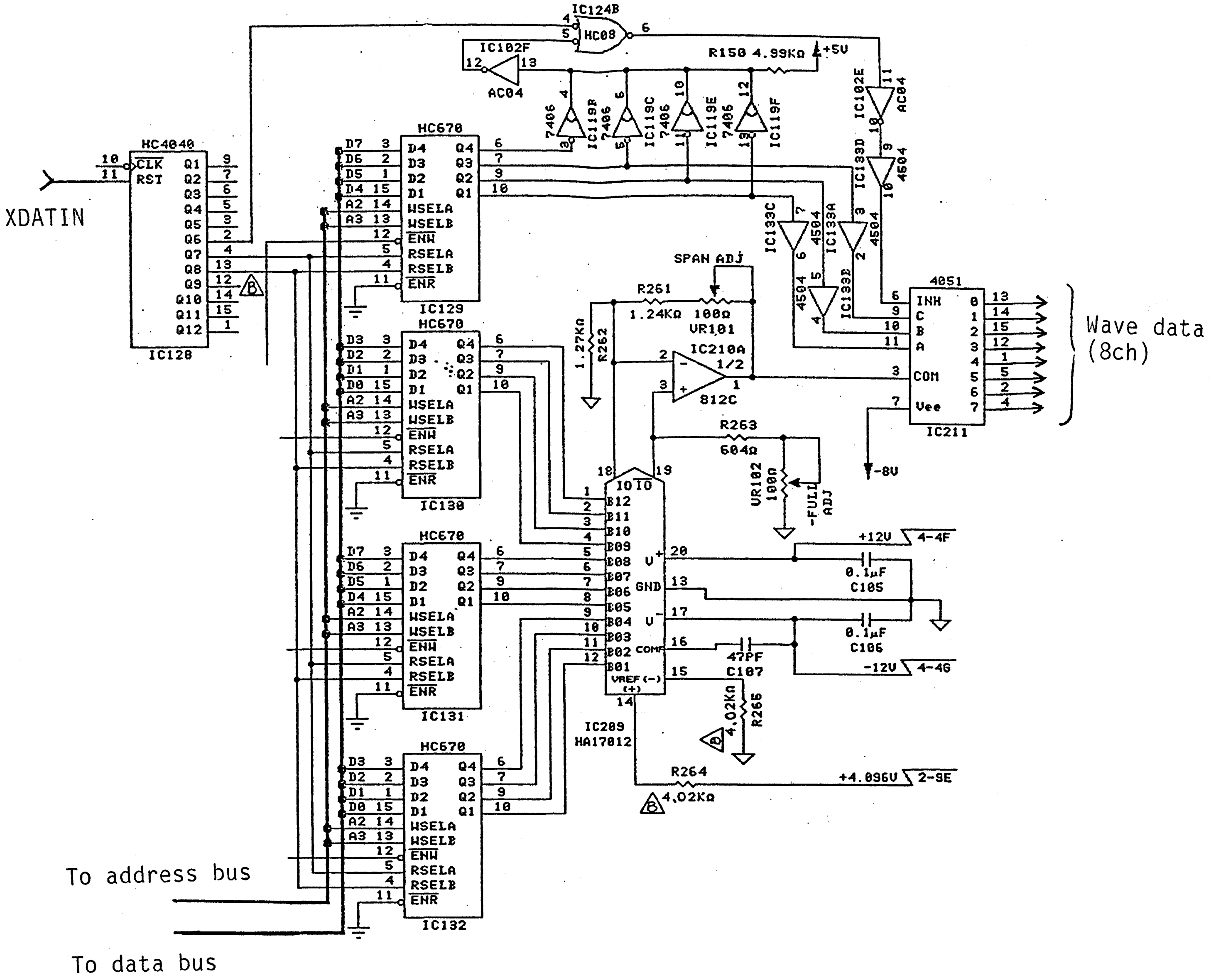

+5V
IC206
HC367
D3
D4
D5
D2
D1
D0
1Y
2Y
3Y
4Y
5Y
6Y
1A
2A
3A
4A
5A
6A
G1
G2
AUX1C
AUX2C
AUX3C
3-1E.1-7D
XCSIOA
3-1F.1-7D
XCSIOB
XRD
IC110A
AC32
IC110D
AC32

MEASURE signal

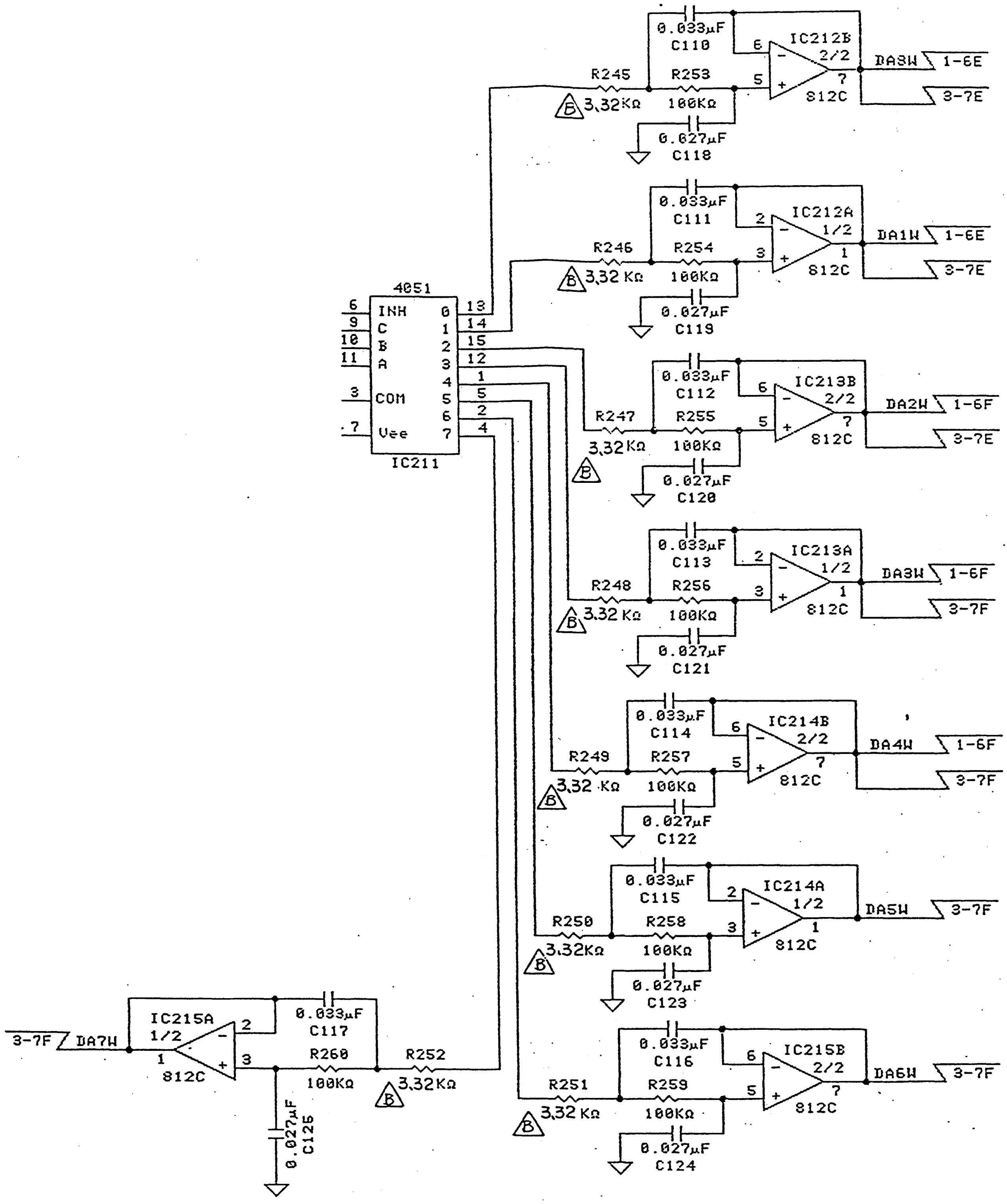
To system bus

4) Waveform output circuit block

This circuit is for waveform output to central monitor or other external instrument. Waveform data from CPU is written into IC129- IC132 register file. This file has capacity to store four 16 bit data. 16 bit data is read out while XDATIM signal is "L". Among 16-bit data, lower 12 bits are for D/A converter form waveform signals. Upper 4 bits include information to which line D/A converter output waveform signal should be connected. IC211 switches output line. D/A output channel "0" is inhibitted by setting IC211 to OFF. Maximum 8 waveform output channels are available as additional 4 waveform signals can be output after 4 waveform channels output in the next timing.


XDATIN
HC4040
IC128
IC124B
HC08
IC102F
AC04
R150 4.99KΩ
+5V
7406
IC119A
IC119C
IC119E
IC119F
IC102E
IC133D
IC133C
IC133A
IC133B
4504
HC670
IC129
IC130
IC131
IC132
SPAN ADJ
R261
1.24KΩ
100Ω
VR101
1.27KΩ
R262
IC210A
1/2
812C
R263
604Ω
VR102
100Ω
-FULL ADJ
4051
IC211
INH
COM
Vee
-8V
Wave data
(8ch)
IC209
HA17012
1010
+12V
4-4F
0.1μF
C105
0.1μF
C106
47PF
C107
-12V
4-4G
4.02KΩ
R265
R264
4.02KΩ
+4.096V
2-9E
To address bus
To data bus

Waveform signal distributed by IC211 are smoothed with IC212- 215 and output to central monitor and WS interface.

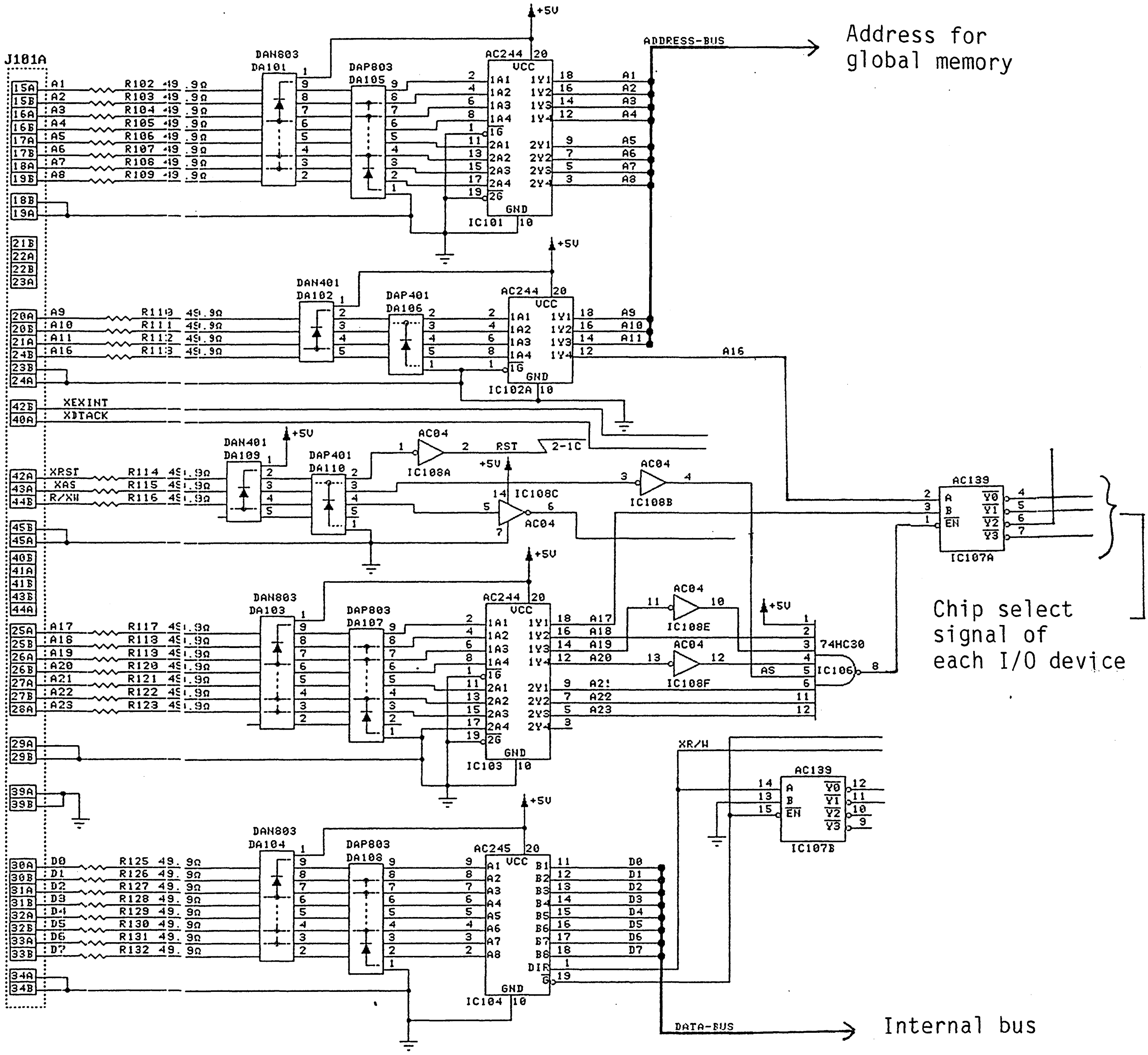

0.033µF
C110
IC212B
2/2
6
5
7
R245
R253
3.32KΩ
100KΩ
812C
DA8W
1-6E
3-7E
0.027µF
C118
0.033µF
C111
IC212A
1/2
2
3
1
R246
R254
3.32 KΩ
100KΩ
812C
DA1W
1-6E
3-7E
0.027µF
C119
4051
INH
C
B
A
COM
Vee
0
1
2
3
4
5
6
7
6
9
10
11
3
7
13
14
15
12
1
5
2
4
IC211
0.033µF
C112
IC213B
2/2
R247
R255
3.32KΩ
100KΩ
812C
DA2W
1-6F
3-7E
0.027µF
C120
0.033µF
C113
IC213A
1/2
R248
R256
3.32 KΩ
100KΩ
812C
DA3W
1-6F
3-7F
0.027µF
C121
0.033µF
C114
IC214B
2/2
R249
R257
3.32 KΩ
100KΩ
812C
DA4W
1-6F
3-7F
0.027µF
C122
0.033µF
C115
IC214A
1/2
R250
R258
3.32KΩ
100KΩ
812C
DA5W
3-7F
0.027µF
C123
IC215A
1/2
3-7F
DA7W
812C
0.033µF
C117
R260
100KΩ
R252
3.32KΩ
0.027µF
C125
0.033µF
C116
IC215B
2/2
R251
R259
3.32 KΩ
100KΩ
812C
DA6W
3-7F
0.027µF
C124
B

4.2.7 WS interface unit QI-812P

This unit is required to connect the bedside monitor with WS-841R/821R thermal array recorder. This unit is provided RS232C communication interface for output data to a personal computer.

1) CPU inferface circuit block

This block is assigned to address E50000H- E70000H and IC106, IC107 and IC108 decode to assign each address. IC107A outputs chip select signal for each I/O device. Lower address A1- 11 is for global memory (dual-port RAM) address which is used to communicate with WS recorder. Lower bits only of data become internal bus via buffer and connected to each block.


J101A
+5V
ADDRESS-BUS
DAN803 DA101
DAP803 DA105
AC244
VCC
GND
IC101
A1 A2 A3 A4 A5 A6 A7 A8
R102 49.9Ω
R103 49.9Ω
R104 49.9Ω
R105 49.9Ω
R106 49.9Ω
R107 49.9Ω
R108 49.9Ω
R109 49.9Ω
DAN401 DA102
DAP401 DA106
IC102A
A9 A10 A11 A16
R110 49.9Ω
R111 49.9Ω
R112 49.9Ω
R113 49.9Ω
XEXINT
XDTACK
DAN401 DA109
DAP401 DA110
XRST
XAS
R/XW
R114 49.9Ω
R115 49.9Ω
R116 49.9Ω
AC04
IC108A
RST
2-1C
IC108C
IC108B
AC139
IC107A
DAN803 DA103
DAP803 DA107
IC103
A17 A18 A19 A20 A21 A22 A23
R117 49.9Ω
R118 49.9Ω
R119 49.9Ω
R120 49.9Ω
R121 49.9Ω
R122 49.9Ω
R123 49.9Ω
IC108E
IC108F
74HC30
IC106
AS
XR/W
IC107B
DAN803 DA104
DAP803 DA108
AC245
IC104
DIR
D0 D1 D2 D3 D4 D5 D6 D7
R125 49.9Ω
R126 49.9Ω
R127 49.9Ω
R128 49.9Ω
R129 49.9Ω
R130 49.9Ω
R131 49.9Ω
R132 49.9Ω
DATA-BUS

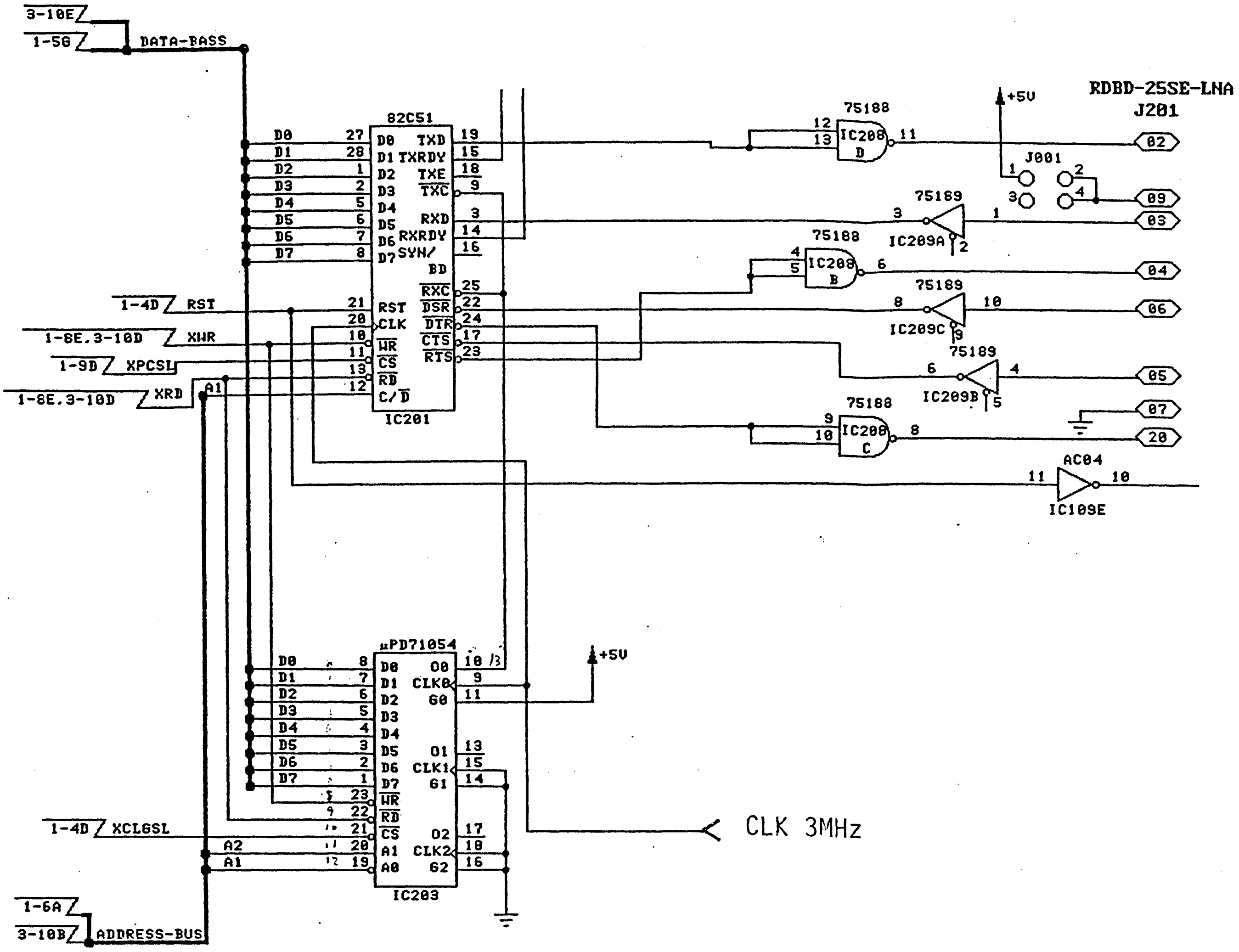
Address for global memory

Chip select signal of each I/O device

Internal bus

2) Serial communication circuit block

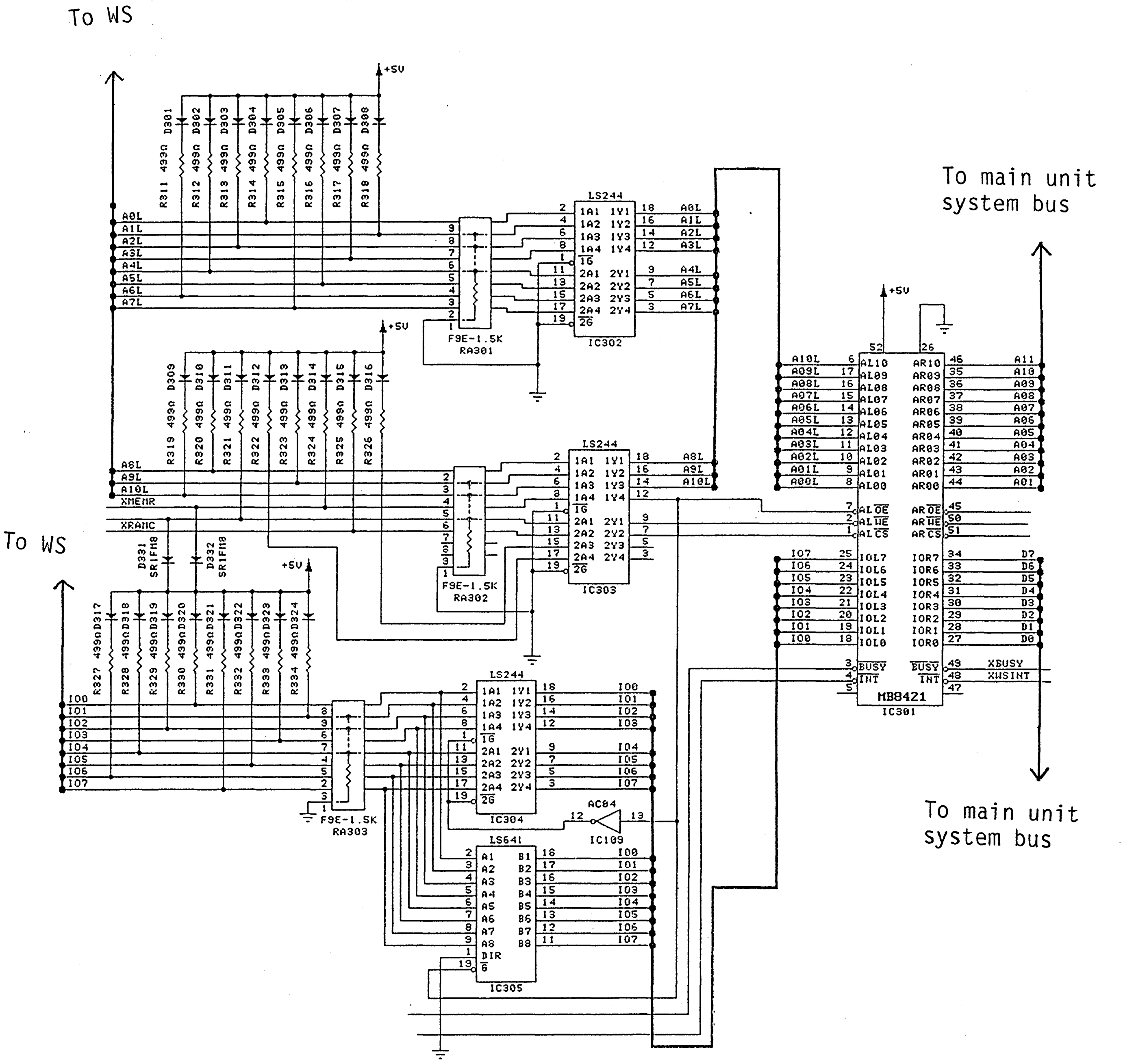
IC201 is a serial communicaiton controller device. Parallel data from CPU is converted into serial data. In order to convert serial data into RS232C standard format, data is output through IC208 and IC209 to communicate with a personal computer. IC203 is a clock oscillator (baud rate generater) which determines communication speed. Various buad rates are provided by changing frequency dividing ratio.



3-10E
1-5G
DATA-BASS
82C51
IC201
D0 D1 D2 D3 D4 D5 D6 D7
TXD
TXRDY
TXE
TXC
RXD
RXRDY
SYN/BD
RXC
DSR
DTR
CTS
RTS
RST
CLK
WR
CS
RD
C/D
1-4D RST
1-8E.3-10D XWR
1-9D XPCSL
1-8E.3-10D XRD
A1
75188
IC208 D
IC208 B
IC208 C
75189
IC209A
IC209C
IC209B
+5V
J001
RDBD-25SE-LNA
J201
02
09
03
04
06
05
07
20
AC04
IC109E
μPD71054
IC203
O0
CLK0
G0
O1
CLK1
G1
O2
CLK2
G2
A1
A0
A2
1-4D XCL6SL
1-6A
3-10B
ADDRESS-BUS
CLK 3MHz

3) Global memory (dual-port RAM) circuit block

This circuit communicates with WS thermal array recorder. IC301 is the center of this block. It is called a dual-port RAM which provides L (Left) port and R (Right) port, and 2K byte memory capacity. Memory can be accessed through the both ports. When data is written into specified address, other side port is interrupted. Communcaition is made each other by writing data into memory and writing command to address. System bus of bedside monitor is connected to port R and system bus of WS is connected to port L. Buffer to drive connection cable and terminator are connected to port L for recorder.


To WS
To WS
To main unit system bus
To main unit system bus
+5V
R311 499Ω D301
R312 499Ω D302
R313 499Ω D303
R314 499Ω D304
R315 499Ω D305
R316 499Ω D306
R317 499Ω D307
R318 499Ω D308
R319 499Ω D309
R320 499Ω D310
R321 499Ω D311
R322 499Ω D312
R323 499Ω D313
R324 499Ω D314
R325 499Ω D315
R326 499Ω D316
R327 499Ω D317
R328 499Ω D318
R329 499Ω D319
R330 499Ω D320
R331 499Ω D321
R332 499Ω D322
R333 499Ω D323
R334 499Ω D324
D331 SR1FM8
D332 SR1FM8
A0L
A1L
A2L
A3L
A4L
A5L
A6L
A7L
A8L
A9L
A10L
XMEMR
XRAMC
IO0
IO1
IO2
IO3
IO4
IO5
IO6
IO7
F9E-1.5K RA301
F9E-1.5K RA302
F9E-1.5K RA303
LS244 IC302
LS244 IC303
LS244 IC304
LS641 IC305
AC04 IC109
MB8421 IC301
1A1 1A2 1A3 1A4 1G 2A1 2A2 2A3 2A4 2G
1Y1 1Y2 1Y3 1Y4 2Y1 2Y2 2Y3 2Y4
A1 A2 A3 A4 A5 A6 A7 A8 DIR G
B1 B2 B3 B4 B5 B6 B7 B8
AL10 AL09 AL08 AL07 AL06 AL05 AL04 AL03 AL02 AL01 AL00
AR10 AR09 AR08 AR07 AR06 AR05 AR04 AR03 AR02 AR01 AR00
AL OE AL WE AL CS
AR OE AR WE AR CS
IOL7 IOL6 IOL5 IOL4 IOL3 IOL2 IOL1 IOL0
IOR7 IOR6 IOR5 IOR4 IOR3 IOR2 IOR1 IOR0
BUSY INT
S0 S1
A11 A10 A09 A08 A07 A06 A05 A04 A03 A02 A01
D7 D6 D5 D4 D3 D2 D1 D0
XBUSY
XWSINT

Section 5

5. Circuit descriptions for head amplifiers

5.1 ECG Head Amp board, UP-0272 (AC-800PA/PJ)

5.1.1 General

The hybrid IC (IC007) "ISOLATE" is mounted not only on this ECG head amplifier but also on other head amplifier boards. In the IC007, F-CLK Generator supplies power to the floating circuit, and the switching circuit SW1 demodulates the modulated signal from the floating circuit.

The hybrid IC (IC009-012) "ECG BUF" bufs the ECG input signal and detects any electrode disconnection.

The hybrid IC (IC008) "ECG SEL" selects an ECG lead. In the IC008, the switching circuit SW3 modulates the selected ECG signal.

The S-P converter (IC005) outputs the ECG lead selection signal to the multiplexer (MPX1) in IC008 and the neutral electrode selection signal (for negative feed-back) to the analog switch SW2 (IC003B) or IC009-011.

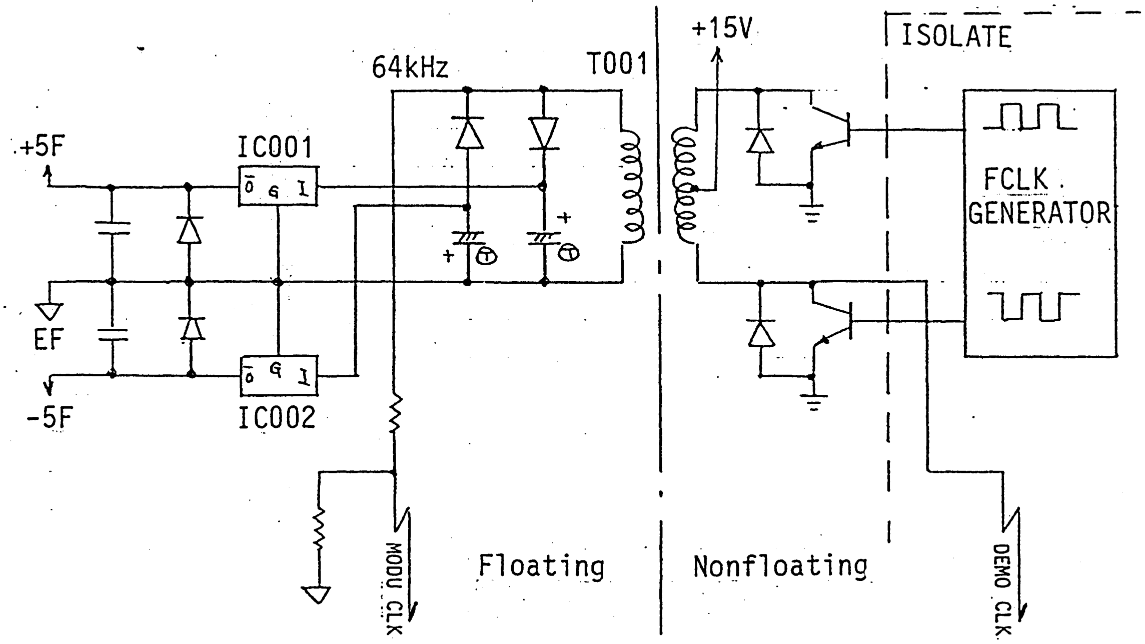
The counter (IC006) controls the IC005 and the multiplexer (IC004) "MPX2" for time-sharing electrode disconnection signals.

5.1.2 Floating power circuit

On the following circuit, the DC-DC converter circuit supplies power (+5F, EF, -5F) to the floating circuit.

The MODU CLK signal is 64kHZ chopping signal to modulate the time-shared signal so as to transfer the time-shared signal from the floating circuit to the nonfloating circuit.

The DEMO CLK signal is 64kHz chopping signal to demodulate the chopped signal. The MODU CLK and DEMO CLK signals are synchronized with opposite polarity.



64kHz
T001
+15V
ISOLATE
+5F
IC001
EF
-5F
IC002
FCLK
GENERATOR
MODU CLK
Floating
Nonfloating
DEMO CLK

NOTE: The floating power circuit for the other Head Amp boards are same as the above circuit.

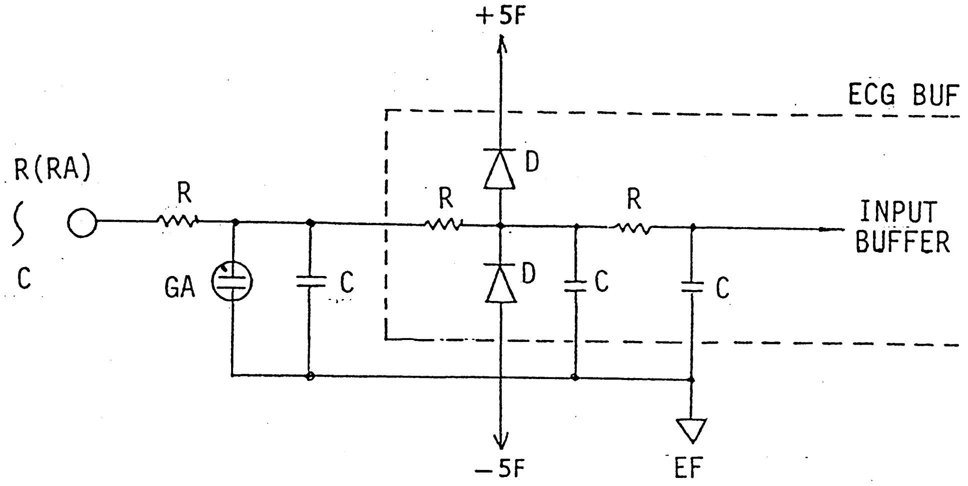
5.1.3 Input protection circuit

1) Electrosurgery interference elimination filter

On the following circuit, a low-pass filter composed of 3-stage R-C connection attenuates high frequency component (100dB down or more between 300kHz and 5MHz) of electrosurgery interference. The low-pass filter is intended to monitor ECG, to protect the input circuit and to reduce heat in case of simultaneous use of an electrosurgery unit.

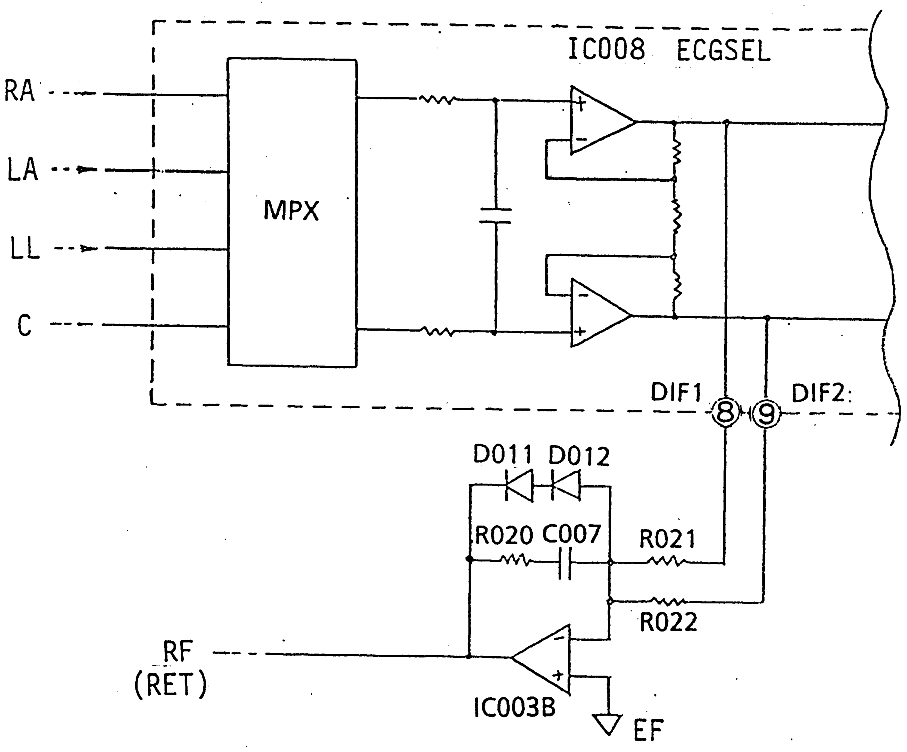
2) Defibrillator discharge protector

On the following circuit, the series-connected resistors limit the discharge current to protect the input circuit against an excessive voltage input signal, and the gas arrestor and diodes limit the discharge voltage when a discharge is started with a defibrillator.



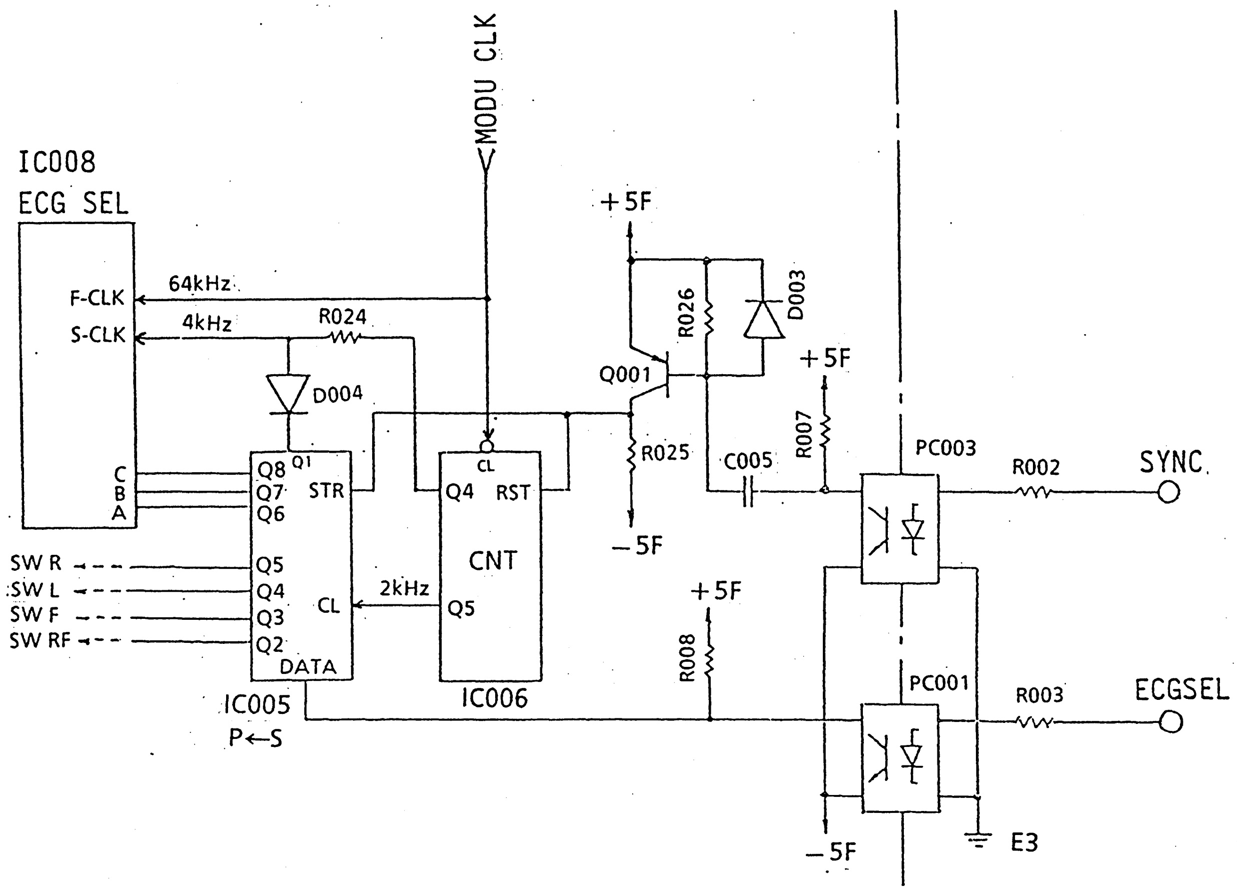
5.1.4 Negative feed-back circuit

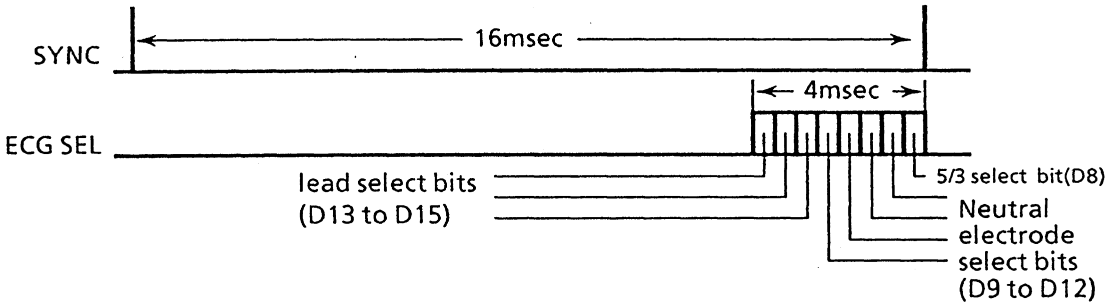
In theory, in-phase artifact included in ECG wave should not interfere with ECG wave signal since ECG signal is pre-amplified with a differential amplifier. However, actually ECG signal with in-phase artifact appears between the DIF1 and DIF2 since in-phase signal changes to a signal with some phase difference due to impedance imbalance between the electrodes. To overcome this, the output signals from the differential amplifiers are branched to the negative feed-back circuit for neutral electrode (DIF1 and DIF2). The negative feed-back circuit attenuates in-phase component based on the Floating Ground (EF) and obtains high Common Mode Rejection Ratio (CMRR).


IC008 ECGSEL
RA
LA
LL
C
MPX
DIF1
DIF2
⑧
⑨
D011 D012
R020 C007
R021
R022
RF
(RET)
IC003B
EF

5.1.5 ECG lead selection circuit

The following ECG SEL signal through the photocoupler (PC001) selects and ECG lead and a nuetral electrode line for negative feed-back from input signal lines. The ECG SEL signal is converted with the S-P converter (IC005) to parallel signals. SW R, SW L, SW F, or SW RF of the parallel signals control each ECG BUF (IC009-012) to select a neutral electrode from the four electrodes.


MODU CLK
IC008
ECG SEL
F-CLK
S-CLK
64kHz
4kHz
R024
D004
C
B
A
Q8
Q1
Q7
STR
Q6
Q5
Q4
CL
Q3
Q2
DATA
SW R
SW L
SW F
SW RF
IC005
P←S
2kHz
CL
Q4
RST
CNT
Q5
IC006
+5F
R026
D003
Q001
R025
−5F
+5F
R007
C005
+5F
R008
PC003
R002
SYNC
PC001
R003
ECGSEL
−5F
E3


SYNC
16msec
4msec
ECG SEL
lead select bits
(D13 to D15)
5/3 select bit(D8)
Neutral
electrode
select bits
(D9 to D12)

Each bit combination of the ECG SEL signal and ECG lead is related as follows:

[3 electrode lead]

Lead	Electrodes						ECG SEL bits							
	ECG1			ECG2			D15	D14	D13	D12	D11	D10	D9	D8
	+	N	-	(=ECG1)										
I	L	F	R	L	F	R	1	1	1	1	1	0	1	1
II	F	L	R	F	L	R	1	1	0	1	0	1	1	1
III	F	R	L	F	R	L	1	0	1	0	1	1	1	1

[5 electrode leads]

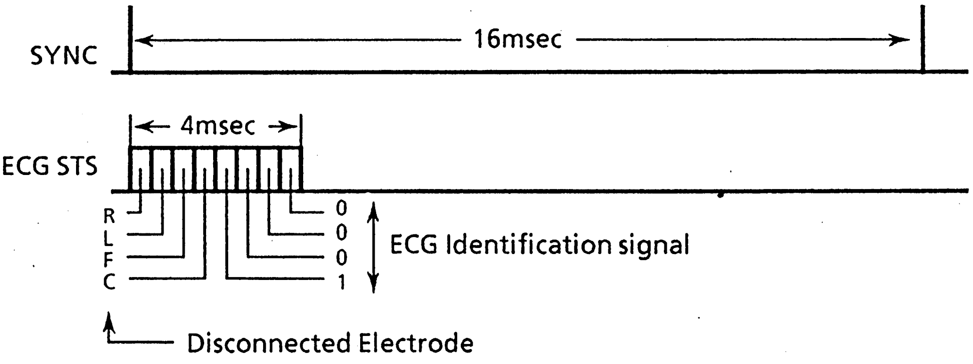
Lead	Electrodes						ECG SEL bits							
	ECG1			ECG2			D15	D14	D13	D12	D11	D10	D9	D8
	+	N	-	+	N	-								
I	L	RF	R	F	RF	R	1	1	1	1	1	1	0	0
II	F		R				1	1	0	1	1	1	0	0
III	F	↑	L	↑	↑	↑	1	0	1	1	1	1	0	0
aVR	R		(L+F)/2				1	0	0	1	1	1	0	0
aVL	L		(R+F)/2				0	1	1	1	1	1	0	0
aVF	F		(R+L)/2				0	1	0	1	1	1	0	0
V	C	↓	(R+L+F)/2	↓	↓	↓	0	0	1	1	1	1	0	0
MCL	C		L				0	0	0	1	1	1	0	0

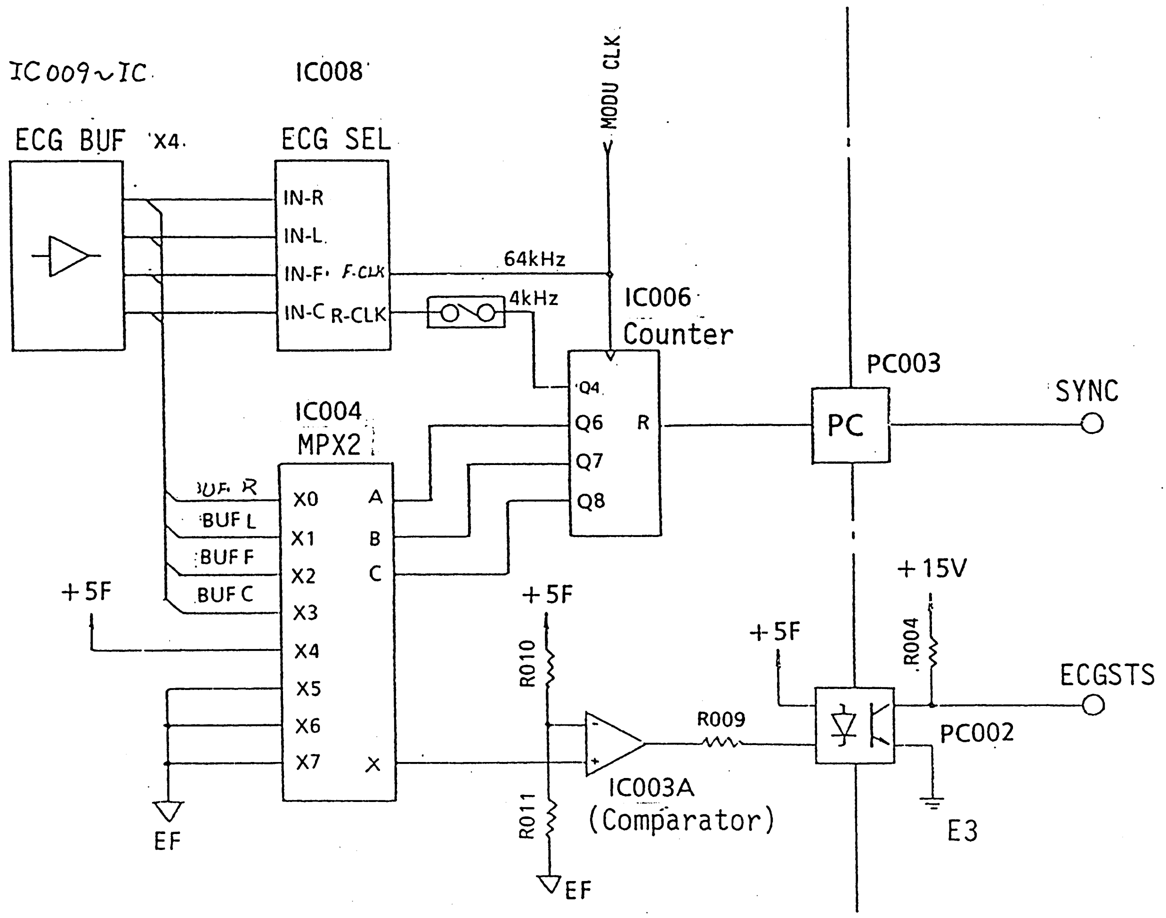
5.1.6 Electrode disconnection detection circuit

The loop circuit between a patient and the input circuit is closed through negative feed-back circuit when the electrode leads are connected to the patient. However, the loop circuit is opened and related ECG BUF output (BUF R, BUF L, BUF F or BUF C) is drawn to the floating power voltage when an electrode is disconnected.

The multiplexer (IC004) "MPX2" time-shares the BUF F, L, F or C signal to be a serial format signal (ECG STS signal).

The comparator (IC003A) compares the time-shared signal with the reference voltage and outputs ECG STS signal to the nonfloating circuit.


SYNC
16msec
4msec
ECG STS
R
L
F
C
0
0
0
1
ECG Identification signal
Disconnected Electrode


IC009~IC
ECG BUF
X4
IC008
ECG SEL
IN-R
IN-L
IN-F
F-CLK
IN-C
R-CLK
MODU CLK
64kHz
4kHz
IC006
Counter
Q4
Q6
Q7
Q8
R
PC003
PC
SYNC
IC004
MPX2
BUF R
BUF L
BUF F
BUF C
X0
X1
X2
X3
X4
X5
X6
X7
A
B
C
X
+5F
EF
+5F
R010
R011
EF
IC003A
(Comparator)
R009
+5F
+15V
R004
ECGSTS
PC002
E3

A disconnected electrode and bits combination of ECG STS signal are related as follows:

[3 electrode leads]

Lead	Neutral electrode	Electrode condition	ECG STS bits			
			D7	D6	D5	D4
			R	L	F	C
I	F	Normal	0	0	0	1
		R: disconnect	1	0	0	1
		L: disconnect	0	1	0	1
		F: disconnect	1	1	0	1
		Open	1	1	0	1
II	L	Normal	0	0	0	1
		R: disconnect	1	0	0	1
		L: disconnect	1	0	1	1
		F: disconnect	0	0	1	1
		Open	1	0	1	1
III		Normal	0	0	0	1
		R: disconnect	0	1	1	1
		L: disconnect	0	1	0	1
		F: disconnect	0	0	1	1
		Open	0	1	1	1

[5 electrode leads]

Lead	Neutral electrode	Electrode condition	ECG STS bits			
			D7	D6	D5	D4
			R	L	F	C
All leads	RF	Normal	0	0	0	0
		R: disconnect	1	0	0	0
		L: disconnect	0	1	0	0
		F: disconnect	0	0	1	0
		F: disconnect	0	0	1	1
		C: disconnect	0	0	0	1
		RF: disconnect	1	1	1	1
		Open	1	1	1	1

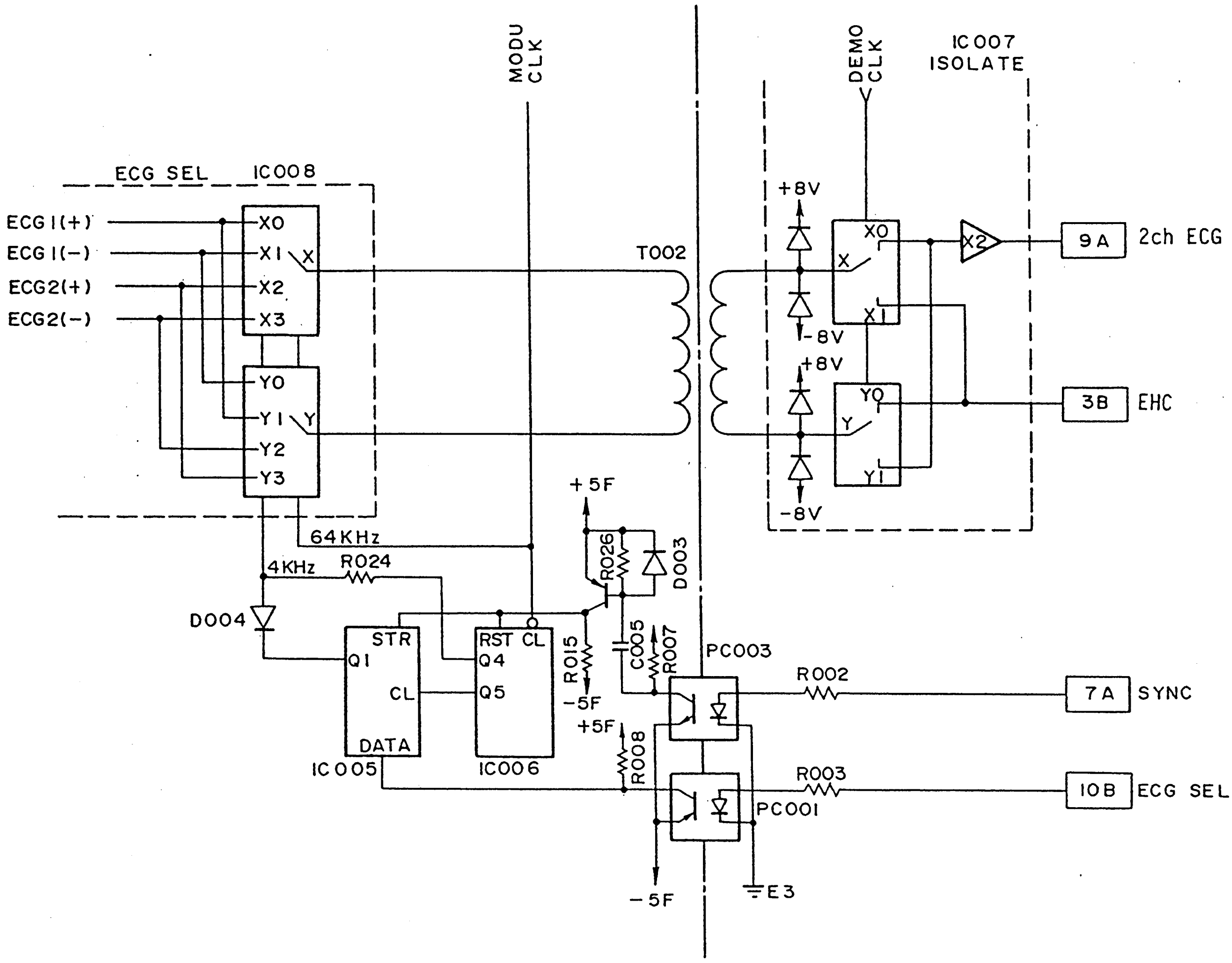
5.1.7 ECG signal modulation/demodulation circuit

When the 3-electrode lead mode is selected, only ECG1 is modulated with the MODU CLK signal on the floating circuit and demodulated with DEMO CLK signal on the nonfloating circuit since IC005-Q1 is set to low level.

When the 5-electrode lead mode is selected, ECG1 and ECG2 are alternately time-shared every 125usec with 4kHz clock from IC006-Q4 and modulated with MODU CLK since IC005-Q1 is set to high level.

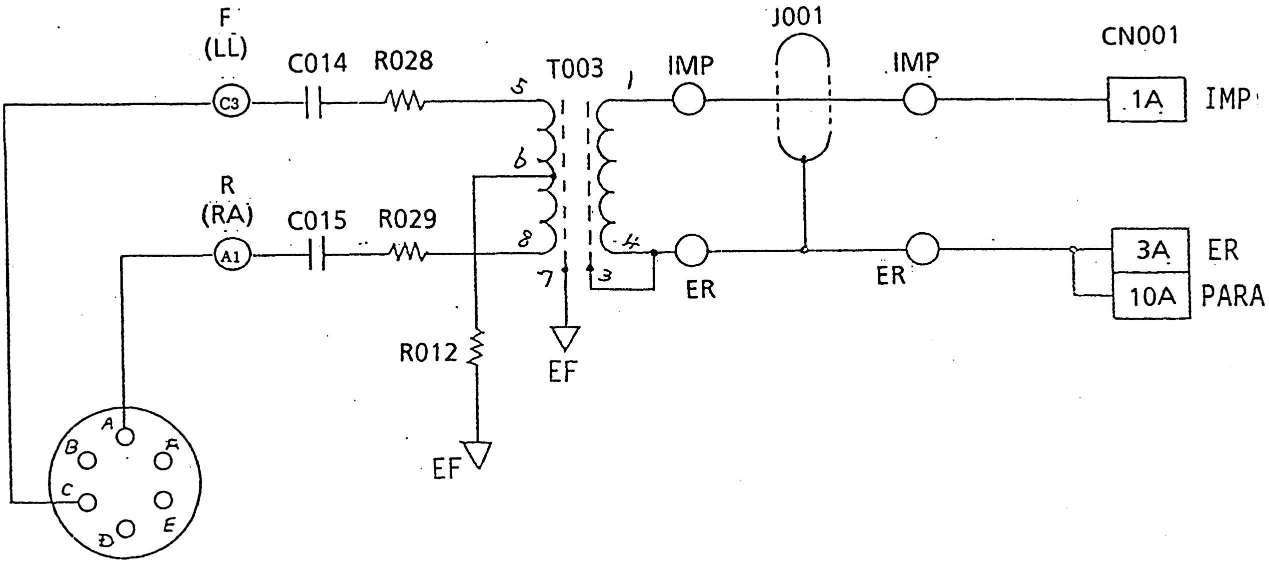
The time-shared 2ch ECG signal is divided into two signals, ECG1 and ECG2 on the UP-0270.

NOTE: Modulation with MODU CLK circuit and demodulation with DEMO CLK circuit, which are provided with the other head amp boards are the same as the above circuit.


MODU CLK
DEMO CLK
IC007
ISOLATE
ECG SEL
IC008
ECG1(+)
ECG1(-)
ECG2(+)
ECG2(-)
X0
X1
X
X2
X3
Y0
Y1
Y
Y2
Y3
T002
+8V
-8V
+8V
-8V
X0
X
X1
X2
9A
2ch ECG
Y0
Y
Y1
3B
EHC
64KHz
4KHz
R024
D004
STR
Q1
CL
DATA
IC005
RST
CL
Q4
Q5
IC006
+5F
R026
D003
R015
-5F
+5F
C005
R007
R008
PC003
R002
7A
SYNC
R003
PC001
10B
ECG SEL
-5F
E3

5.1.8 Respiration signal detection circuit

Respiration waveform is detected by means of impedance method. Impedance between the R (RA) and F (LL) electrodes is excited with 76.8kHz carrier signal (10Vp-p) from the UP-0519. Impedance is changed by inspiration and expiration.


F
(LL)
C3
C014
R028
T003
5
1
IMP
J001
IMP
CN001
1A
IMP
6
R
(RA)
A1
C015
R029
8
4
7
3
ER
ER
3A
ER
10A
PARA
R012
EF
EF
A
B
C
D
E
F

5.2 RESP Amp board, UP-0519

This board of the BSM-8300 series bedside monitors is not a component of the head amplifiers. However, explanation of this board is neccessory to understand the functions of the AC-800PA/J ECG/Resp head amplifier when used with the BSM-8300.

5.2.1 General

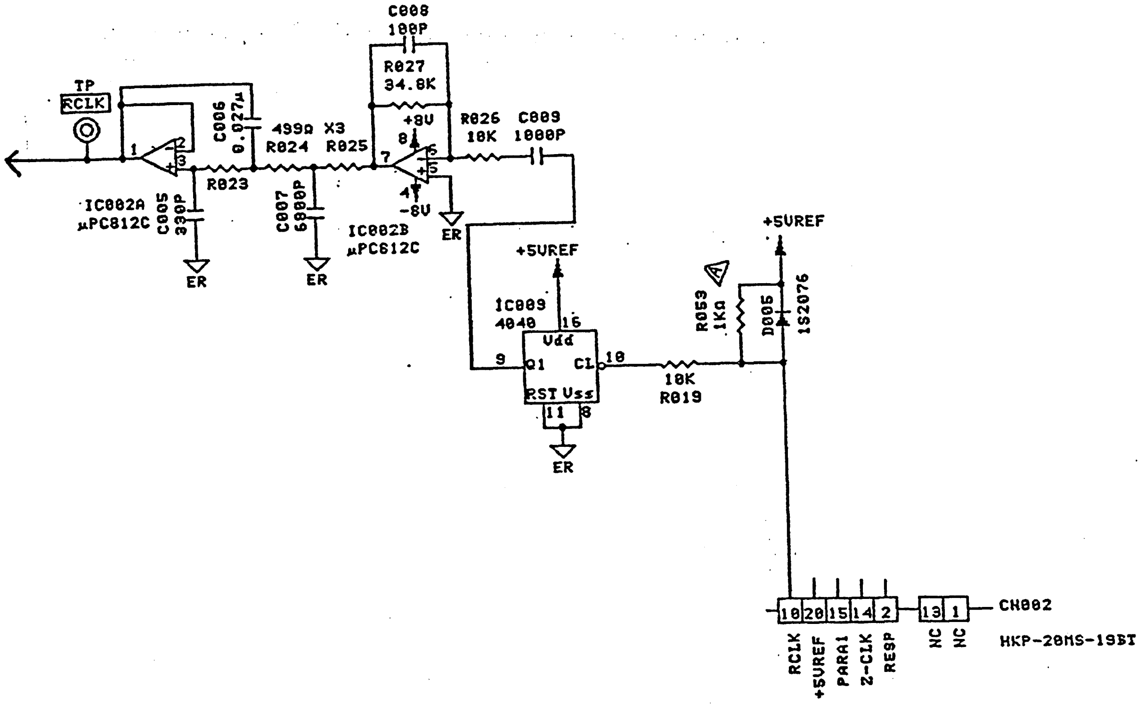
The respiration amplifier board UP-0519 consists of the following components:

1) 76.8kHz carrier generator to detect and carry respiration signal
2) 20-times preamplifier
3) Respiration synchronization detector
4) 5Hz low-pass filter
5) Auto-shift circuit with 91-times amplifier
6) Output buffer with 5Hz low-pass filter
7) Respiration measure on/off control comparator

5.2.2 76.8kHz carrier generator circuit

In the following circuit, 76.8Hz carrier wave (10Vp-p) is generated to detect respiration.

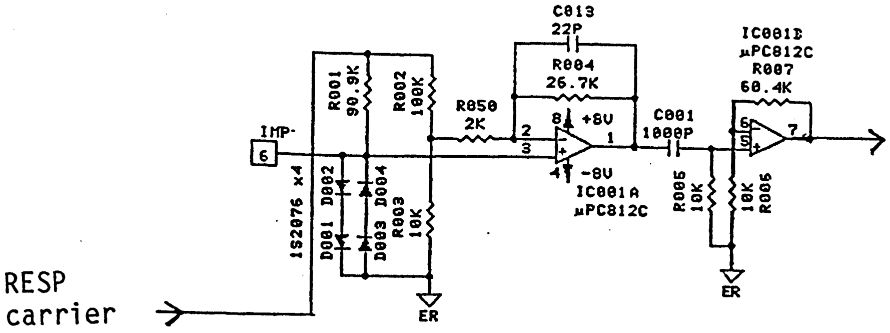
In respiration detection carrier generator, 153.6kHz RCLK frequency is divided into 76.8kHz 5Vp-p squarewave, and then filtered by three steps of low-pass filter composed of IC002, R023- R026 and C005- C007 into 10Vp-p 76.8kHz sinewave respiration detection carrier signal.



C008
100P
R027
34.8K
TP
RCLK
C006
0.027μ
499Ω X3
R024
R025
+8V
R026
10K
C009
1000P
R023
IC002A
μPC812C
C005
330P
C007
6800P
-8V
IC002B
μPC612C
ER
ER
ER
+5VREF
+5VREF
IC009
4040
16
Vdd
9
Q1
CL
10
RST
Vss
11
8
ER
R053
1KΩ
D005
1S2076
10K
R019
10
20
15
14
2
13
1
CH002
RCLK
+5VREF
PARA1
Z-CLK
RESP
NC
NC
HKP-20MS-19ST

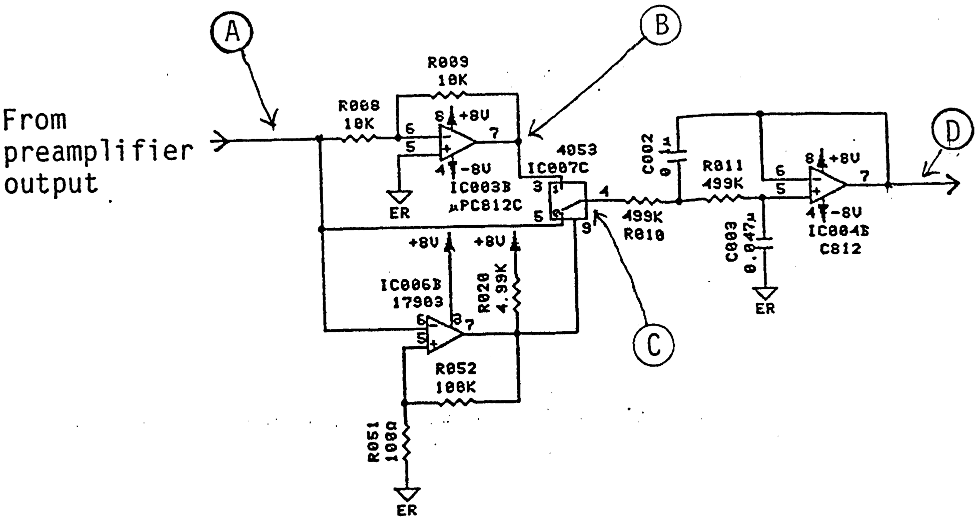
5.2.3 Preamplifier circuit

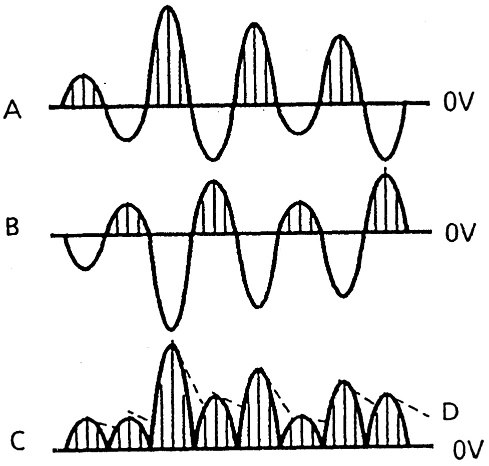
Patient circuit composes of a bridge circuit with R001- R003 and impedance of patient's chest. Bridge circuit is excited by respiration detection carrier and imbalance component of the bridge is approximately 20 times amplified by IC001A and IC001B. When impedance of the patient is high, imbalance component of the bridge becomes large and output of preamplifier becomes large. D001- D004 are for protection of the circuit against over input such as defibrillation discharge.


C013
22P
R004
26.7K
IC001B
μPC812C
R007
60.4K
IMP·
6
R001
90.9K
R002
100K
R050
2K
2
3
8
+8V
1
4
-8V
IC001A
μPC812C
C001
1000P
6
5
7
1S2076 x4
D001
D002
D003
D004
R003
10K
R005
10K
10K
R006
ER
ER
RESP
carrier

5.2.4 Synchronization detector

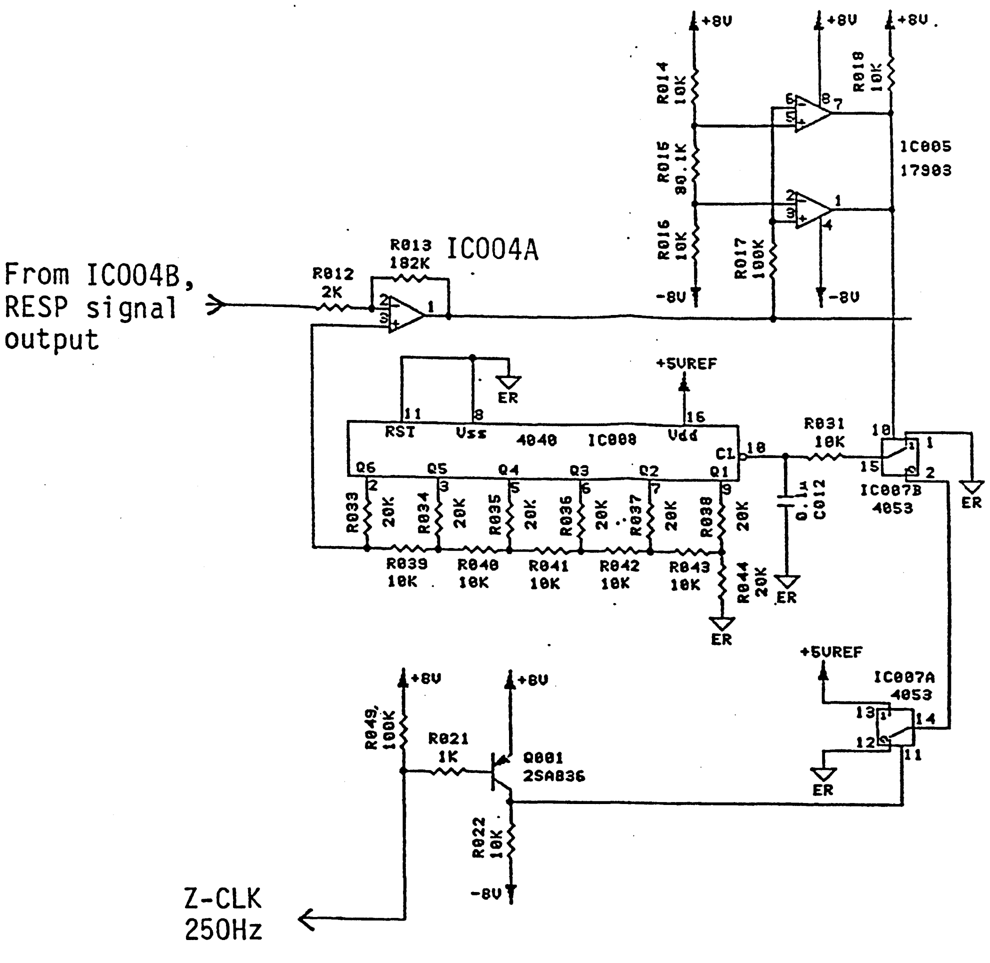
Preamplifier output signal is sent to respiration synchronization detector and low-pass filter. Respiration waveform is full-wave rectified with zero-cross comparator IC006B and analog switch IC007C according to polarity of respiration waveform signal.


A
B
C
D
From preamplifier output
R009
10K
R008
10K
6
5
8
+8V
7
4
-8V
IC003B
μPC812C
ER
4053
IC007C
3
5
4
9
C002
1μ
R011
499K
499K
R010
C003
0.047μ
ER
IC004B
C812
+8V
-8V
IC006B
17903
R020
4.99K
R052
100K
R051
100Ω
ER


A
0V
B
0V
C
D
0V

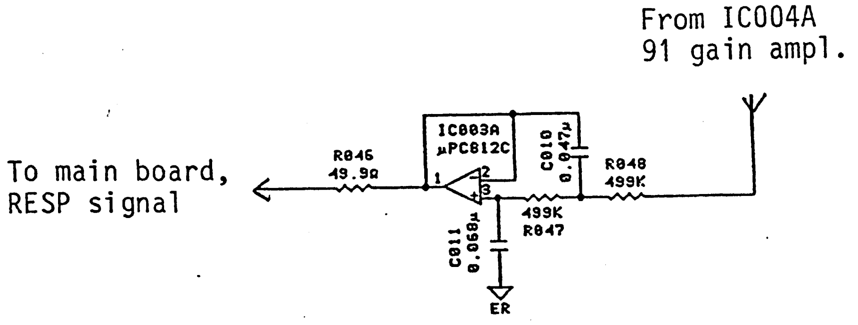
5.2.5 Auto-shift circuit

Auto shift circuit block limits amplitude of respiration waveform so that signal does not saturate in the next 91 times gain amplifier. When output of 91 times gain amplifier IC004A is over +4.8V or below -4.8V, comparator IC005 turns to Low and analog switch IC007B is switched to side "0". Then Z-CLK signal (250Hz) is applied to counter IC008 and the counter starts counting. Output of IC008 is D/A converter by R-2R ladder and 0V to 5V staircase waveform is superimposed on the input signal at IC104A to shift output signal. When output voltage returns inside +4.8V and -4.8V comparator output turns to High and stops Z-CLK signal. IC007A is a level shifter device generating 0V- 5V level voltage from 0V- 8V Z-CLK signal.


From IC004B,
RESP signal
output
R012 2K
R013 182K
IC004A
R014 10K
R015 80.1K
R016 10K
R017 100K
R018 10K
IC005 17903
+8V
-8V
+5VREF
ER
RST
Vss
4040
IC008
Vdd
CL
Q6
Q5
Q4
Q3
Q2
Q1
R033 20K
R034 20K
R035 20K
R036 20K
R037 20K
R038 20K
R039 10K
R040 10K
R041 10K
R042 10K
R043 10K
R044 20K
R031 10K
0.1μ C012
IC007B 4053
IC007A 4053
R049 100K
R021 1K
Q001 2SA836
R022 10K
Z-CLK
250Hz

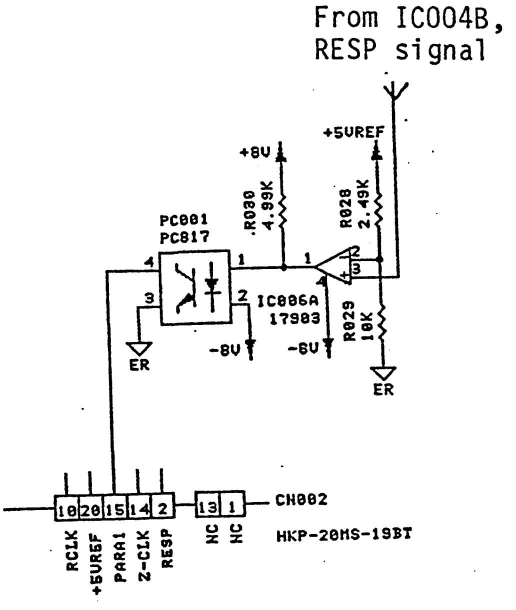
5.2.6 Output buffer circuit

IC003A functions as output buffer to the main board and noise component is removed.


From IC004A
91 gain ampl.
To main board,
RESP signal
R046
49.9Ω
IC003A
μPC812C
C010
0.047μ
R048
499K
499K
R047
C011
0.068μ
1
2
3
ER

5.2.7 Respiration measure signal generator circuit

In respiration measuring condition detector, output signal before auto shift circuit is compared with voltage (4.3V) corresponding to 2 kohm impedance by comparator IC006A by using a nature that output signal becomes large when impedance is high. When impedance is low comparator output is Low and PARA1 signal is High. When impedance is high, PARA1 signal is Low to indicate that respiration measurement is off condition. PARA1 signal is indicated with PAR1 in the main board.


From IC004B,
RESP signal
+5VREF
+8V
R030
4.99K
R028
2.49K
PC001
PC817
IC006A
17903
R029
10K
-8V
-8V
ER
ER
1
2
3
4
CH002
HKP-20MS-19BT
10
20
15
14
2
13
1
RCLK
+5VREF
PARA1
Z-CLK
RESP
NC
NC

5.3 Press Head Amp board UP-0369 (AP-800PA)

5.3.1 General

The exciter (IC006) generates excitation voltage to drive a blood pressure transducer (BP1, BP2).

Blood pressure signals, P1 and P2, from the BP transducers are time-shared with an analog switch (IC003A) through a 200-times preamplifier (P1: IC007/008/011B, P2: IC009/010/012B) and 33Hz low-pass filter (P1: IC011A, P2: IC012A).

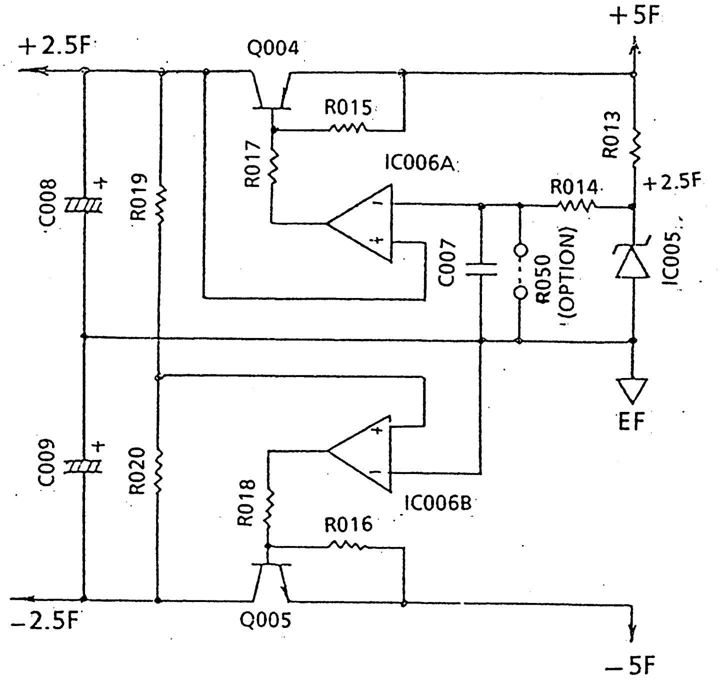
The analog switch (IC003A) is controlled with 125Hz from a counter (IC004).

The comparator (IC013A/B) selects one of four states of PARA signal according to the connection of BP1 and BP2.

5.3.2 Exciter circuit

This circuit generates ±2.5V excitation voltages to excite the blood pressure transducers. The ±2.5V excitation voltages are stabilized through the reference voltage generator (IC005). The excitation voltages can drive two transducers with a load of up to 200ohm.

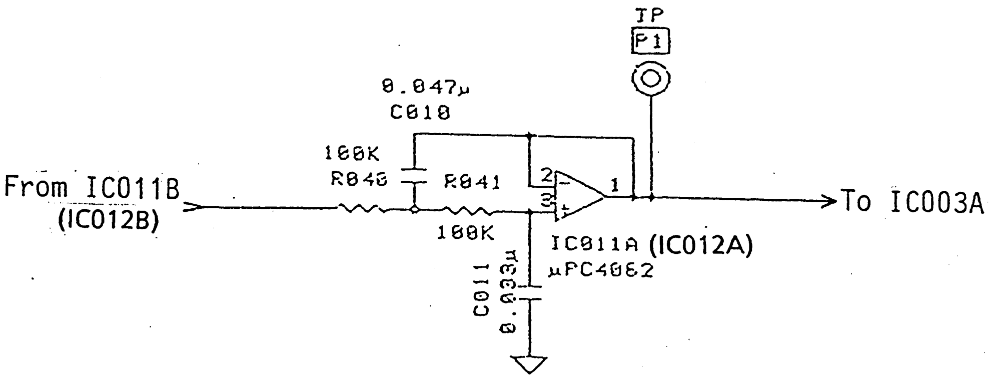
The excitation voltages can be attenuated by mounting a resistor on "R050" location and can be set to a proper voltages for a BP transducer by combining the resistor (R050) with 10kohm (R014).


+5F
+2.5F
Q004
R015
R017
IC006A
R013
R014
+2.5F
C008
R019
C007
R050
(OPTION)
IC005
EF
C009
R020
R018
R016
IC006B
-2.5F
Q005
-5F

5.3.3 33Hz low-pass filter circuit

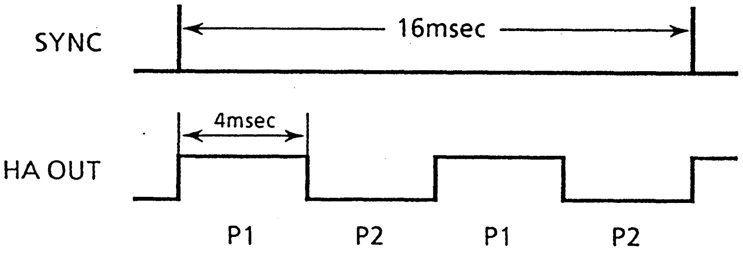
The following 2-stage low-pass filter is provided through the preamplifier to pass the frequency component of blood pressure signal only.

In the following filter, the cut-off frequency is 33Hz. However, the total cut-off frequency is 20Hz or 10Hz (selectable on the SYSTEM SETUP display) by passing software filter of the bedside monitor main unit.


TP
P1
0.047μ
C010
100K
R040
R041
100K
From IC011B
(IC012B)
2
3
1
IC011A (IC012A)
μPC4062
C011
0.033μ
To IC003A

[Output timing]

The P1 and P2 signals are alternately outputted from HA OUT terminal every 4msec synchronizing with the SYNC signal as follows:


SYNC
16msec
4msec
HA OUT
P1
P2
P1
P2

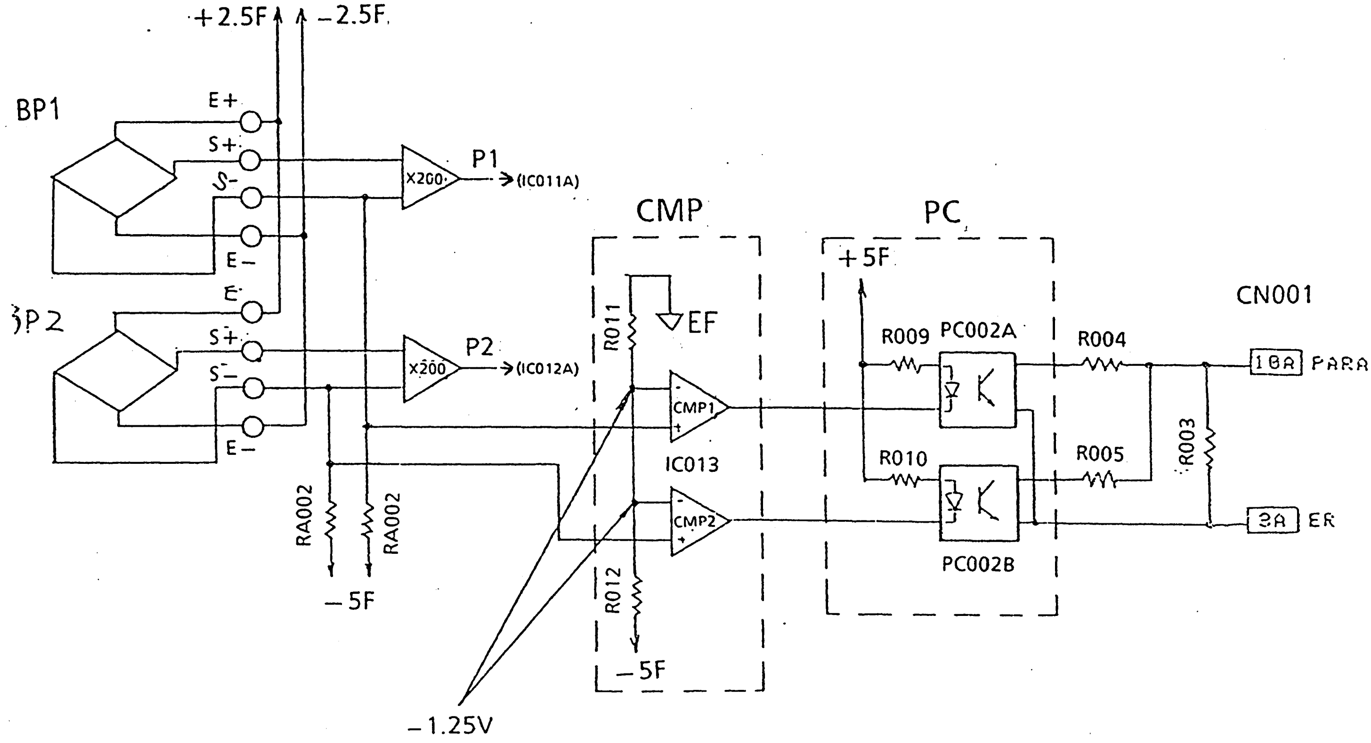
5.3.4 PARA signal generating circuit

The following voltages for the PARA signal are generated according to the connection of BP transducers BP1 and BP2.

Connected transducer	PARA voltage
BP1 and BP2	1.5V ±25mV
BP1	1.35V ±25mV
BP2	1.2V ±20mV
No connection	1.1V ±20mV

When a transducer is not connected, the output from the comparator (IC013A/B) is low level since the positive terminal on the IC013A/B is biased to 5V. The photocoupler (PC002A/B) is set to "ON". The generating voltage for the PARA signal is 1.1V since +5V REF is divided between the pull-up resistor (10kohm) for 5V and resistors (R003-005) in parallel.

When one or two transducers are connected, the output from the IC013A/B is high level since the positive terminal of the IC013A/B is approx. 0V. The PC002A/B is set to "OFF". The generating voltage for the PARA signal is different from 1.1V since resistors in parallel decrease according to the BP1 or BP2 connection.


+2.5F
−2.5F
BP1
E+
S+
S-
E−
BP2
E-
S+
S−
E−
X200
P1
(IC011A)
X200
P2
(IC012A)
CMP
R011
EF
CMP1
IC013
CMP2
R012
−5F
RA002
RA002
−5F
−1.25V
PC
+5F
R009
PC002A
R010
PC002B
R004
R005
R003
CN001
18A
PARA
3A
ER

5.4 CO Head Amp board, UP-0318 (AH-800PA)

5.4.1 General

The 16Hz low-pass filter (R015 & C009, R023 & C011) eliminates only high frequency component, such as electrosurgery interference.

The multiplexer (IC009) time-shares reference signal (REF), injection fluid temp. signal (Ti), blood temp. signal (Tb) and blood temperature variation signal (Tb).

The auto-shift circuit (IC012) shifts DC voltage of the baseline so as not to saturate Tb signal due to 1000-times amplification.

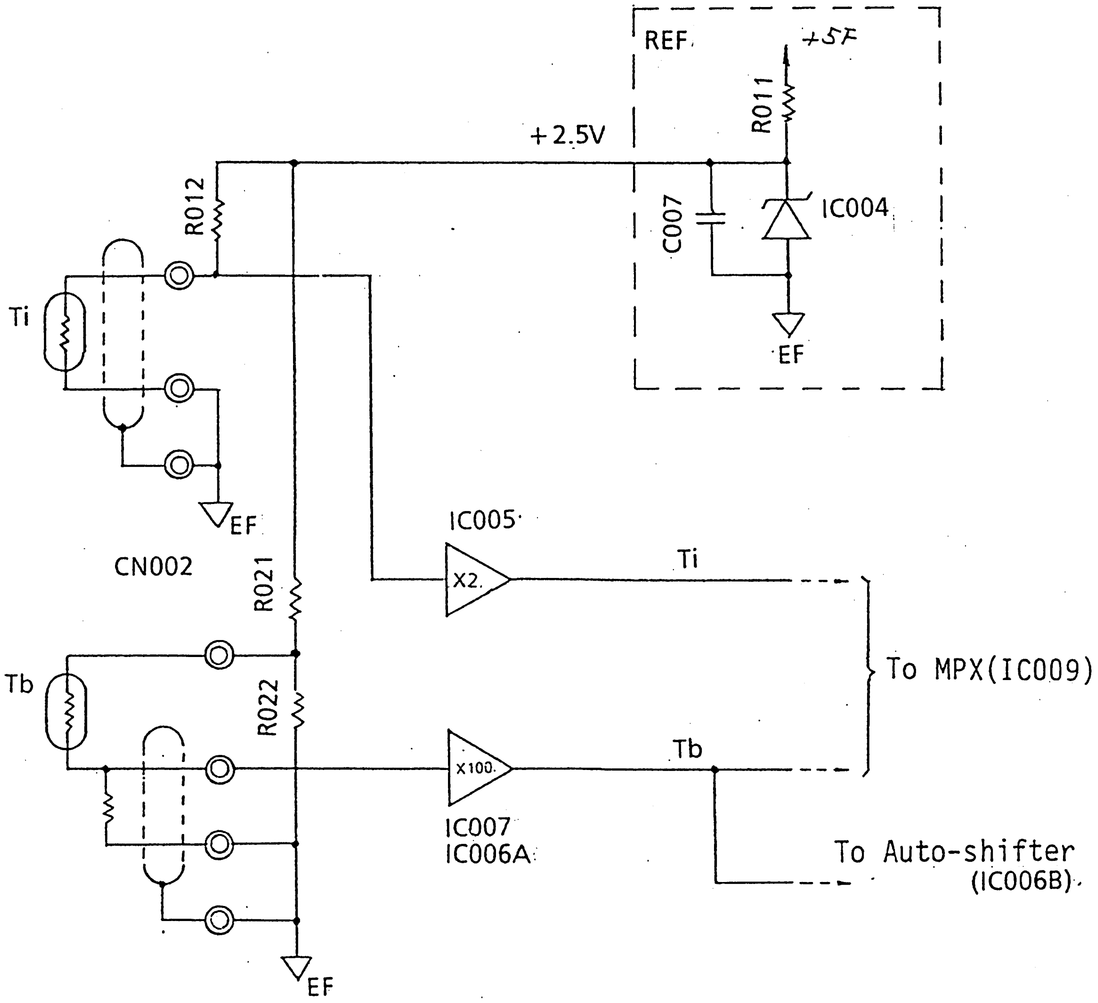
The S-P converter (IC011) controls the IC012.

The counter (IC010) generates 250Hz clock for the IC012 and control signals for the IC009.

5.4.2 Resistance-Voltage (R-V) converter circuit

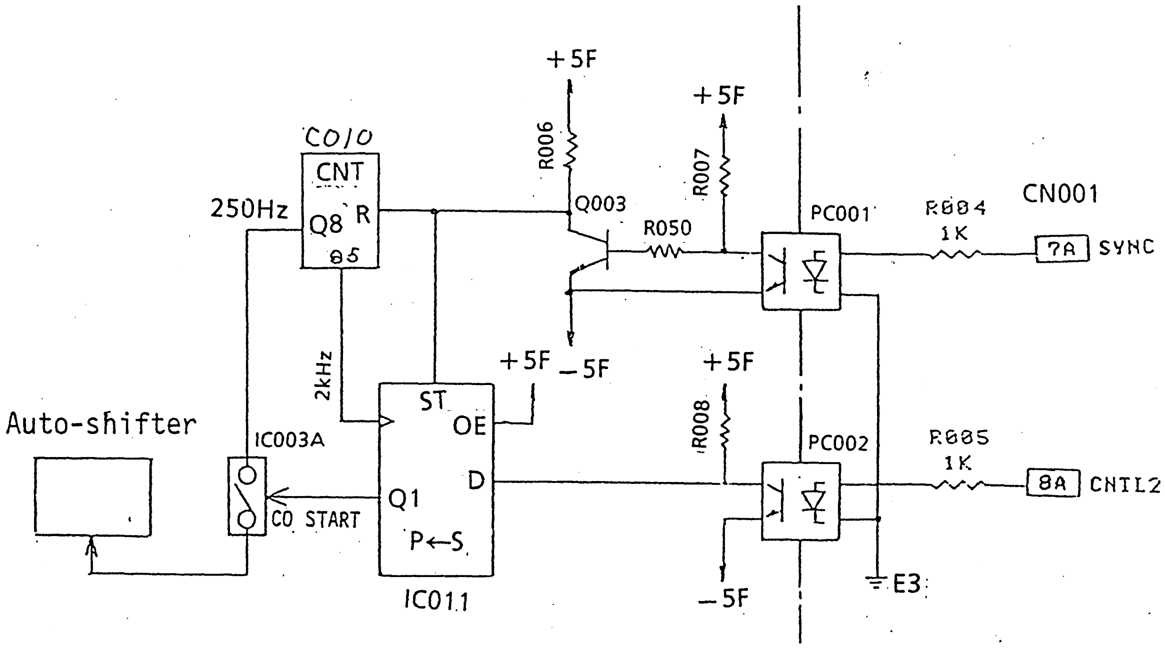
The following IC004 generates +2.5V reference voltage. By dividing the reference voltage between the R012 and Ti-thermistor resistance, the Ti-voltage is obtained according to the Ti-thermistor resistance variation caused by injection fluid temperature.

By dividing the reference voltage between the R021 and R022 and shunting the Tb-catheter thermistor resistance, the Tb-voltage is obtained according to the Tb-resistance variation caused by fluid injection.

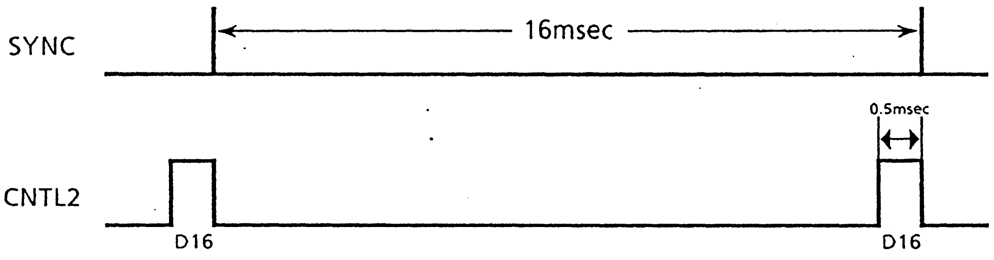

REF.
+5F
R011
+2.5V
C007
IC004
EF
R012
Ti
EF
CN002
R021
IC005
X2.
Ti
To MPX(IC009)
Tb
R022
X100.
Tb
IC007
IC006A
To Auto-shifter
(IC006B)
EF

5.4.3 S-P converter circuit

The "ST" terminal of the S-P converter (IC011) is set to High level when the SYNC signal varies from Low level to High level. Then the analog switch (IC003A) is connected to 250Hz clock to work the Auto-shifter (IC012) with Low signal from Q1 on the IC011 after the D16 on serial format signal CNTL2 is set to High level (CO start signal) as follows:



+5F
+5F
CO10
CNT
250Hz
Q8
R
Q5
R006
R007
Q003
R050
PC001
R004
1K
CN001
7A
SYNC
2kHz
+5F
-5F
+5F
ST
OE
D
Q1
P←S
IC011
Auto-shifter
IC003A
CO START
R008
PC002
R005
1K
8A
CNTL2
-5F
E3



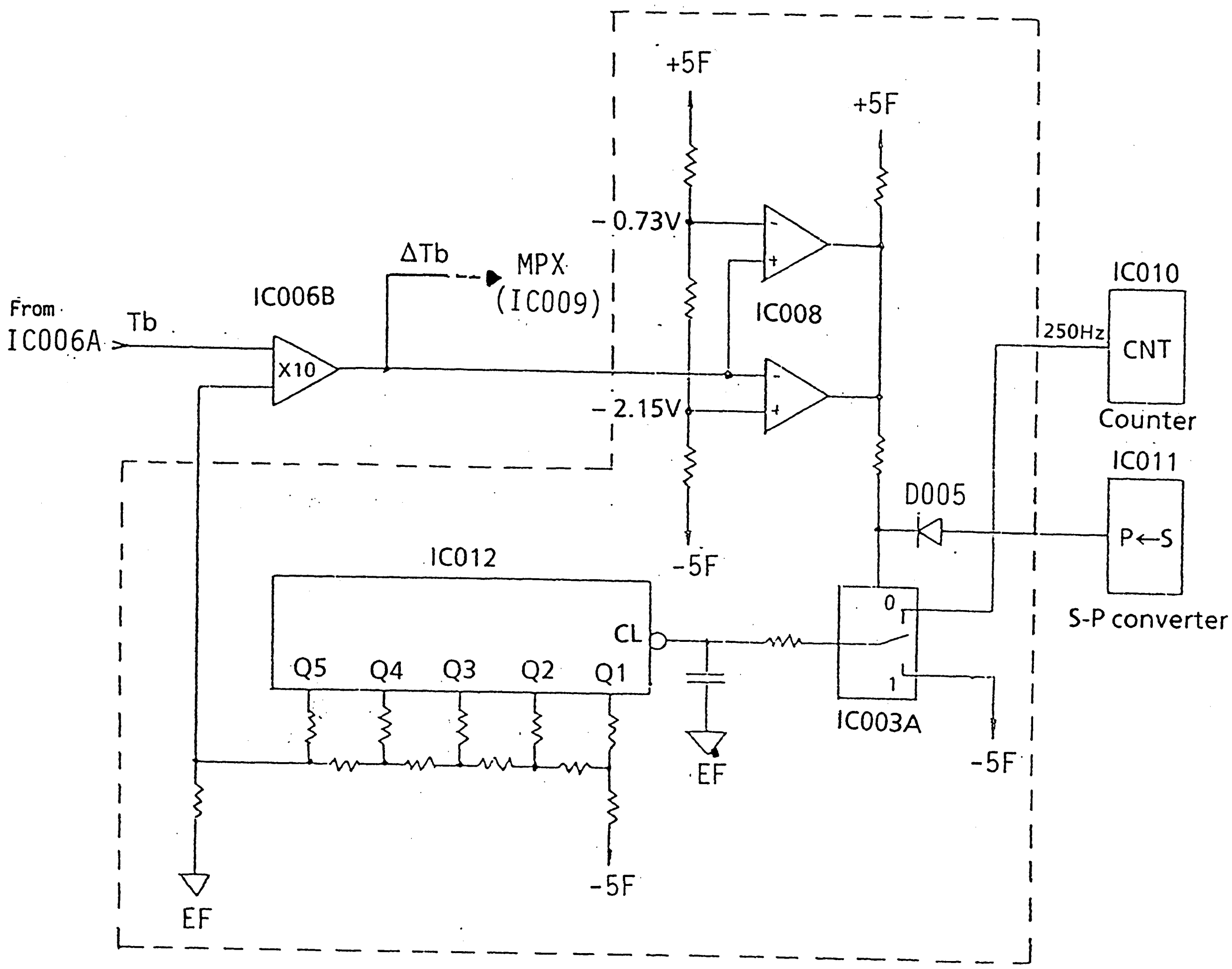
SYNC
16msec
0.5msec
CNTL2
D16
D16

5.4.4 Auto-shift circuit

Blood temperature variation ΔTb needs more amplification than Ti and Tb since the ΔTb signal is a smaller signal variation than Ti and Tb.

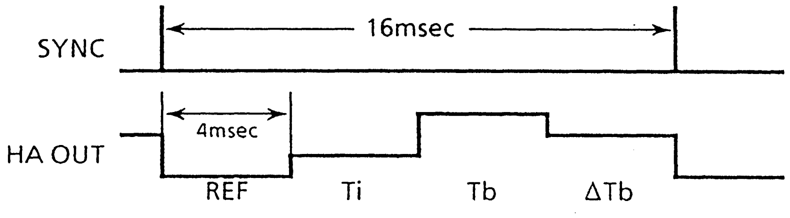
The following auto-shift circuit shifts the ΔTb output voltage so as not to saturate the ΔTb output. When the S-P converter (IC011) outputs a Low level signal to the analog switch (IC003A) after the CO start signal on serial format signal CNTL2 is inputted to the IC011, the IC003A connects the counter (IC010) with the auto-shifter stair-type wave generator (IC012) to shift the ΔTb output voltage from the 10-times amplifier (IC006B).

When the output voltage falls within -2.15V to -0.73V, the comparator (IC008) outputs a High level signal to the IC003A so as to complete the auto-shift function.


+5F
+5F
-0.73V
ΔTb
MPX
(IC009)
From
IC006A
Tb
IC006B
X10
IC008
IC010
250Hz
CNT
Counter
-2.15V
IC011
D005
P←S
S-P converter
IC012
-5F
CL
Q5
Q4
Q3
Q2
Q1
0
1
IC003A
EF
-5F
-5F
EF

[Output timing]

REF, Ti, Tb and Tb are outputted from the HA OUT every 4msec in the following order:


SYNC
16msec
HA OUT
4msec
REF
Ti
Tb
ΔTb

5.5 Temp Head Amp board, UP-0319 (AW-800PA)

5.5.1 General

160Hz low-pass filter (R022 & C107, R023 & C008) eliminates high frequency component, such as electrosurgery interference.

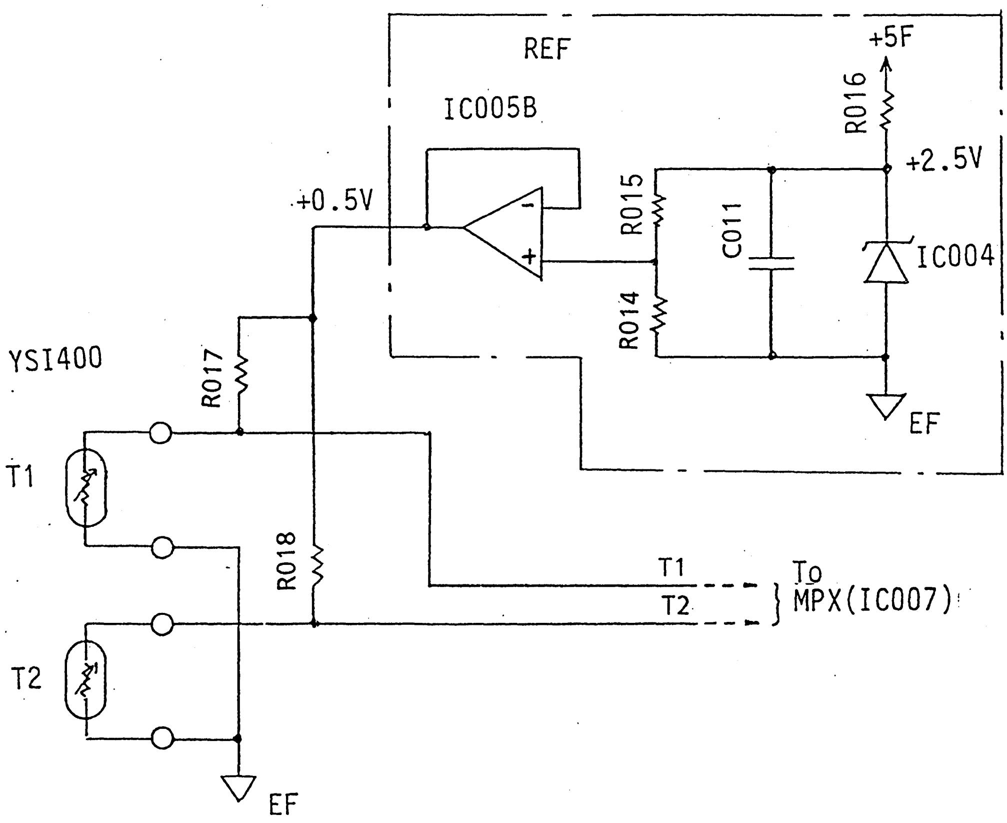
The multiplexer (IC007) time-shares the reference voltage for 27°C (REF0), calibration voltage for 37°C (CAL37) and body temperatures T1 and T2.

The counter (IC008) generates control signals for the IC007.

5.5.2 R-V converter circuit

The following circuit composed of the IC004/005B, R014-016 and C011 generates +0.5V reference voltage.

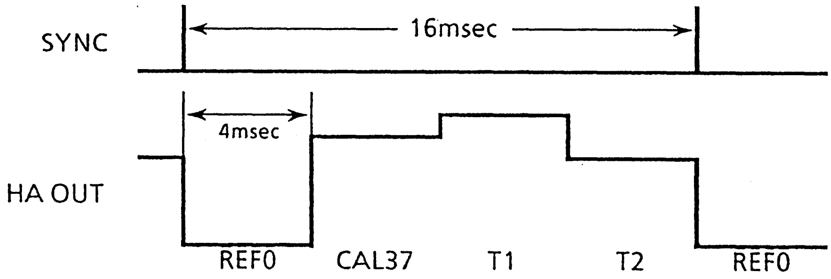
T1 or T2 voltage is obtained according to temperature by dividing the 0.5V reference voltage between the R017 and Ti-thermistor resistance or R018 and T2-thermistor.



REF
+5F
IC005B
R016
+2.5V
+0.5V
R015
C011
IC004
R014
EF
YSI400
R017
T1
T2
R018
T1
T2
To MPX(IC007)
EF

[Output timing]

REFO, CA37, T1 and T2 are outputted from the HA OUT every 4msec in the following order.



SYNC
16msec
4msec
HA OUT
REFO
CAL37
T1
T2
REFO

5.6 EEG head amplififier (AE-800PA)

5.6.1 General

The AE-800PA consists of UP-0421 EEG main board mounting, an EEG, control, output and floating power supply circuits, and UP-0422 EEG sub board mounting an amplifier processing circuit.

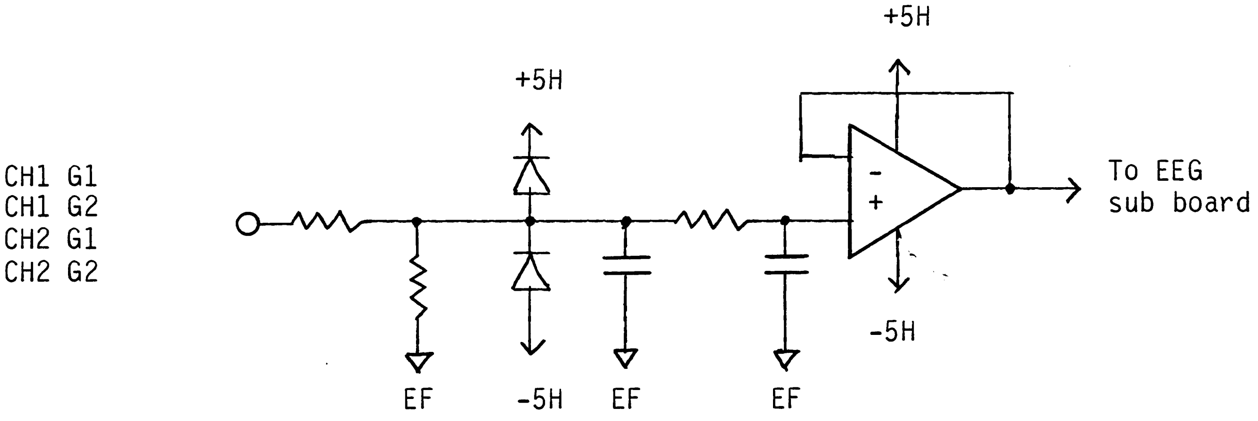
1) UP-0421 EEG main board

Protection filters protect the circuits against large input generated by an ESU and defibrillator, etc. EEG input signals after the protection filters are transfered to the EEG sub board, and amplified, filtered and then returned to the EEG main board. Two EEG signals are time shared every 4msec into EEG1 and EEG2 output signals of the AE-800PA EEG head amplifier. Each buffer output is fed back to the EEG neutral electrode terminal (N) to increase the CMRR(Common Mode Rejection Ratio) to be called Reference Feedback for later descriptions.

2) UP-0422 EEG sub board

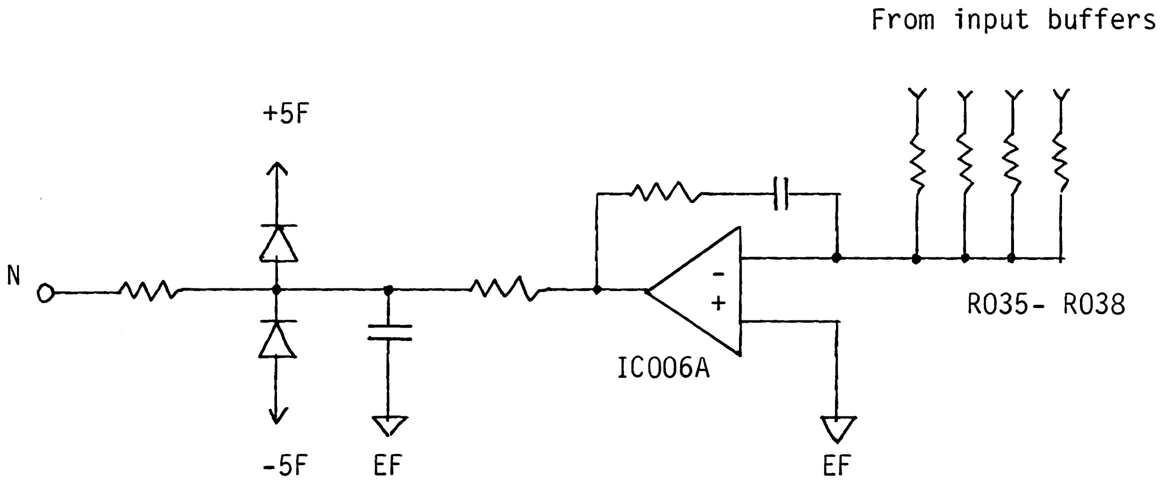
The UP-0422 consists of pairs of total 5000 gain amplifiers, 35Hz high-cut filters and AC interference filters. 0.3sec time constant is determined in this block.

5.6.2 Input buffer on the UP-0421 main board



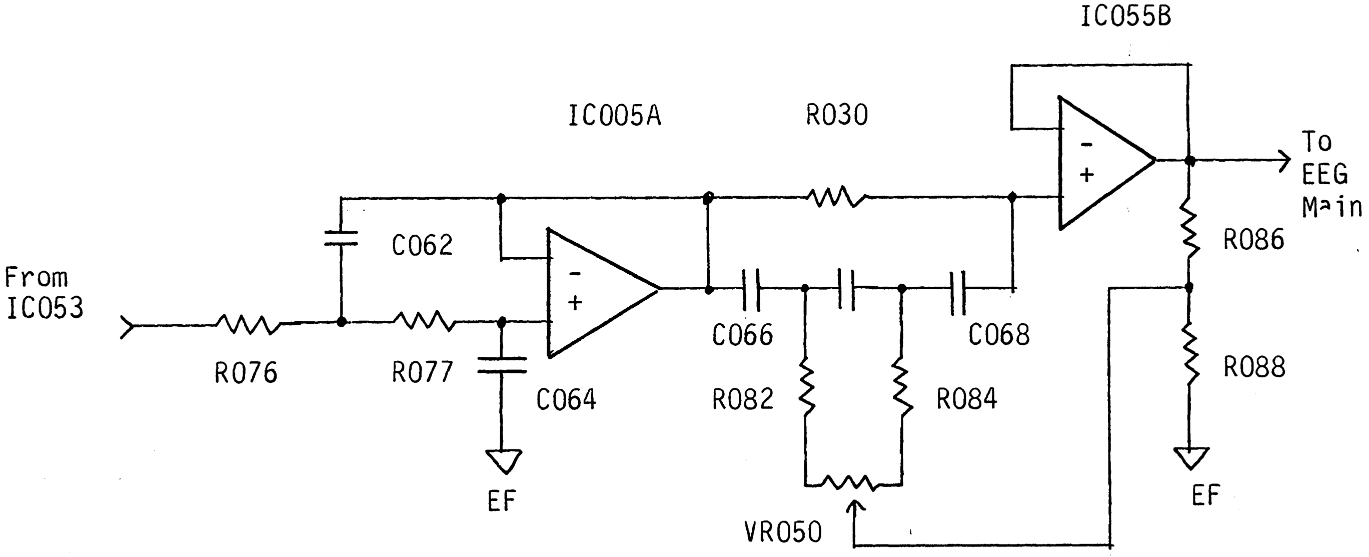
Two CR high-cut filters attenuate noise component in the EEG signal. Resistors limit large current and diodes limit large voltage (from ESU, defibrillator, etc.) to protect against damage of the circuit.

5.6.3 Reference feedback

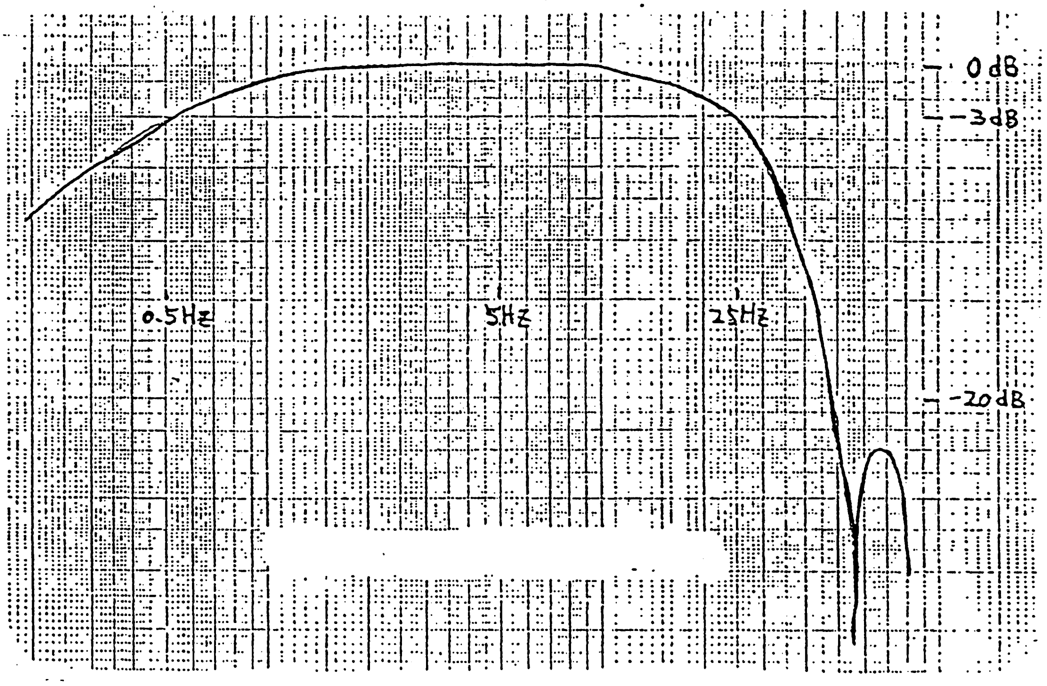


As the EEG signal is amplified by the differential amplifier, theoretically it is not interfered by common mode noise. However, due to variation in electrode impedance and electronic devices used, difference between the phases of the common mode component appears at the EEG amplifier output as noise. By feeding back (negatively) each buffer output to the neutral electrode terminal(N), common mode component referred to the floating ground (EF) is reduced and the CMRR is increased.

5.6.4 High-cut filter and AC filter on the UP-0422 EEG sub board

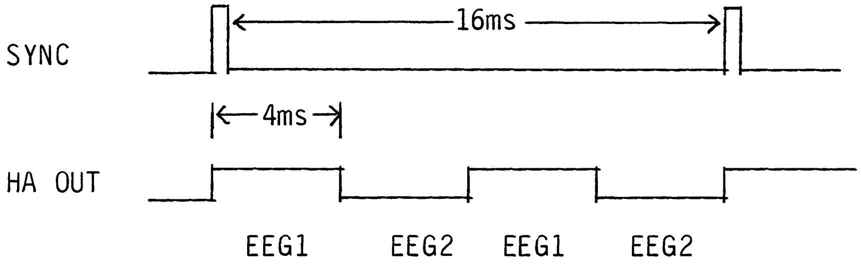

IC055B
IC005A
R030
To EEG Main
C062
R086
From IC053
C066
C068
R088
R076
R077
C064
R082
R084
EF
EF
VR050

Two stage high-cut filters consisting of IC055A, C062, C064, R076 and R077, and AC filter consisting of IC005B, C066, C067, C068, R080, R082, R084, R086, R088 and VR050 filter high frequency components and AC noise in the EEG signal. Total frequency characteristics of the filters is shown below.



5.6.5 Timing of the output signals

This EEG head amplifier outputs in the following timing


SYNC
16ms
4ms
HA OUT
EEG1
EEG2
EEG1
EEG2

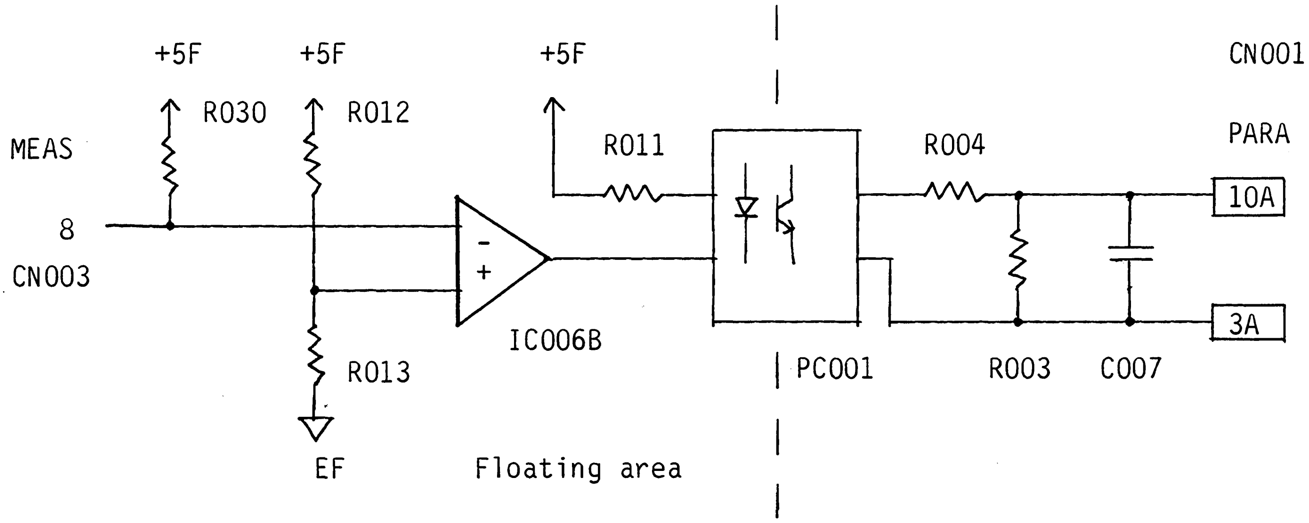
* Refer to the pages of BP head amplifier for signal signal modulation/ demodualtion between the floating area and grounded area.

5.6.6 PAPA signal generating circuit

Connection and disconnection of the EEG cable change the PARA voltage as below:

+1.7V ±40mV ...... not connected

+1.9V ±40mV ...... connected


+5F
+5F
+5F
CN001
R030
R012
MEAS
R011
R004
PARA
8
10A
CN003
-
+
3A
IC006B
R013
PC001
R003
C007
EF
Floating area

When the EEG cable is not connected, comparator input pin-6 of the IC006B is pulled up to +5F through the R030, and the comparator outputs level L. At this condition, the PC001 photocoupler is conductive and the resistance (PARA resistance) across the PARA and ER terminals is a parallel value of the R004 and R003, and the PARA voltage reads +1.7V. This voltage indicates EEG non measuring condition.

When the cable is connected, the PC001 is not conductive, the PARA resistance is R003 only, and PARA voltage reads +1.9V. This voltage indicates EEG measuring condition.

5.7 Respiration head amplifier (AR-800PA)

5.7.1 General

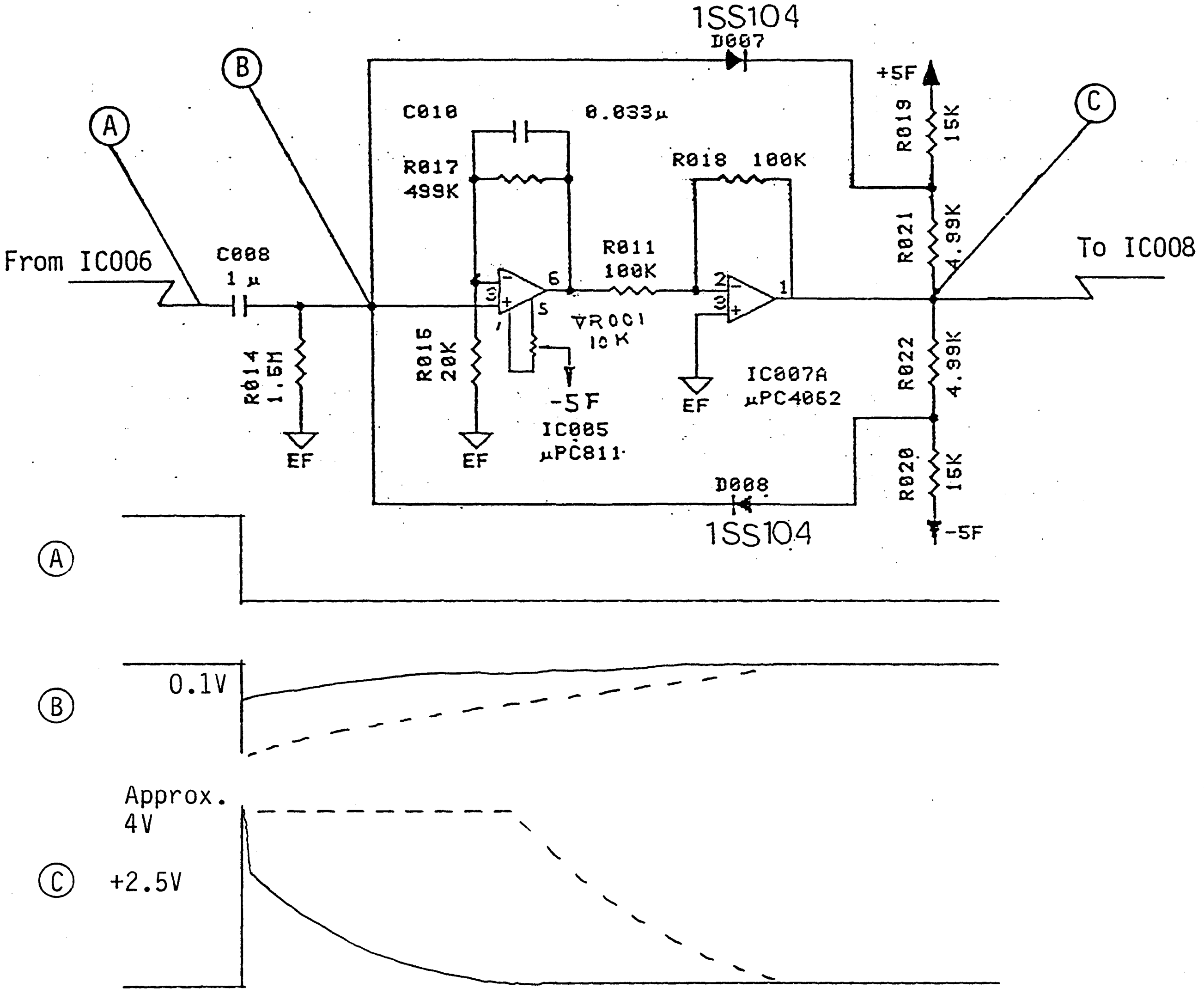
The AR-800PA consists of UP-0458 respiration board mounting floating power supply, respiration pickup exciter voltage (EXC) generator, input high-cut filter (3Hz), amplifier, auto inst (instantaneous baseline recovery) circuit, etc.

5.7.2 Output

Analog signal is outputted without being time shared which is different from other head amplifiers.

5.7.3 Auto Inst (instantaneous baseline recovery) circuit

Auto Inst function works when respiration waveform signal saturates in the circuit just after the pickup is connected to the amplifier or due to over-input.


1SS104
D007
B
+5F
A
C010
0.033μ
R019
15K
C
R017
499K
R018 100K
R021
4.99K
From IC006
C008
1μ
R011
100K
To IC008
3
6
5
2
1
3
VR001
10K
R014
1.5M
R015
20K
-5F
IC005
μPC811
EF
EF
EF
IC007A
μPC4062
R022
4.99K
R020
15K
D008
1SS104
-5F
A
B
0.1V
Approx.
4V
C
+2.5V

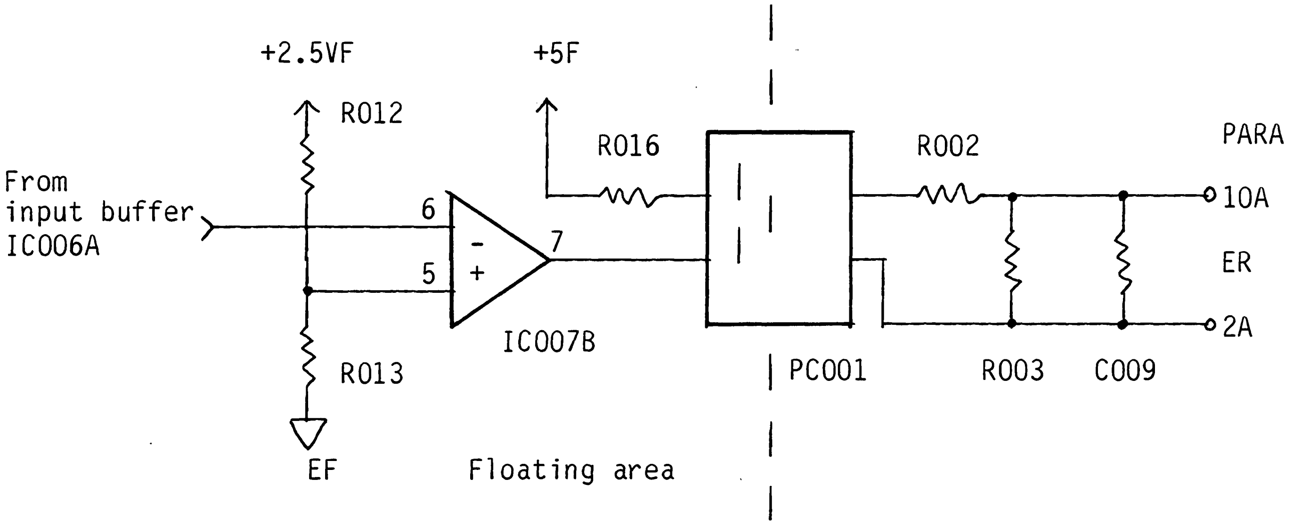
Straight lines indicate the voltages with the auto inst function and dotted lines indicate the voltages without diodes D007 and D008.

5.7.4 PARA signal generating circuit

Connection and disconnection of the respiration pickup change the PARA voltage as below:

+0.58V ±20mV .... no connection

+0.65V ±20mV .... connection


+2.5VF
+5F
R012
R016
R002
PARA
From input buffer IC006A
6
7
5
-
+
10A
ER
2A
IC007B
R013
PC001
R003
C009
EF
Floating area

When the thermistor respiration pickup is not connected, copmarator input pin-6 of the IC007B is approximately +2.5V and the comparator outputs level L. At this condition, PC001 photocoupler is conductive and +0.58V PARA output voltage is obtained. This voltage indicates no respiration measuring condition with the thermistor pickup.

When the pickup is connected, comparator pin-6 input is approximately +1V and the PC001 photocoupler becomes off, and +0.65V PARA voltage is obtained. This voltage indicates respiration measuring condition with the thermistor pickup.

5.7.5 Adjustment

When IC005 and/or VR001 is replaced, offset adjustment is required. QI-814P central interface is required for this adjustment.

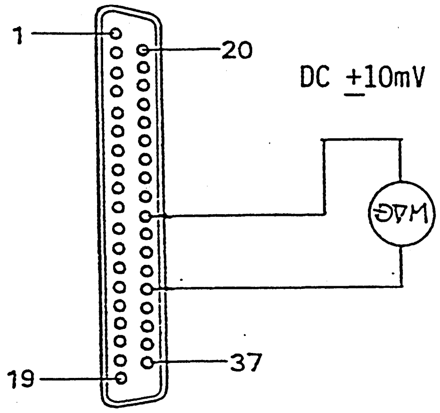
<Offset adjustment>

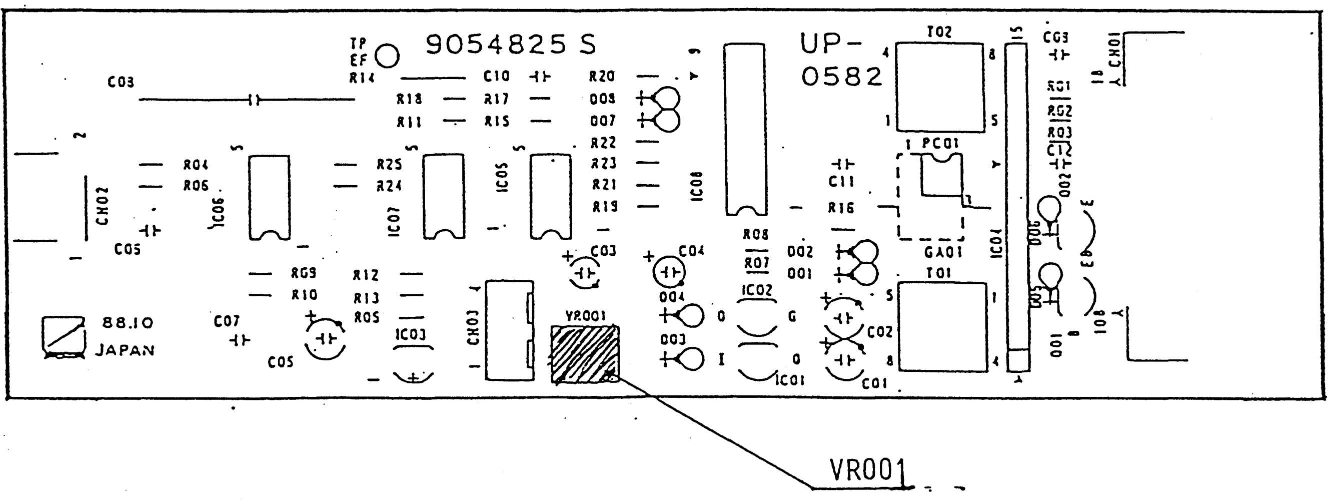
1) Connect the respiration pickup to the respiration head amplifier.

2) Measure voltage with a digital voltmeter across the pin-29 (RW) and pin-33 (GND) of the CNS connector on the QI-814P interface.

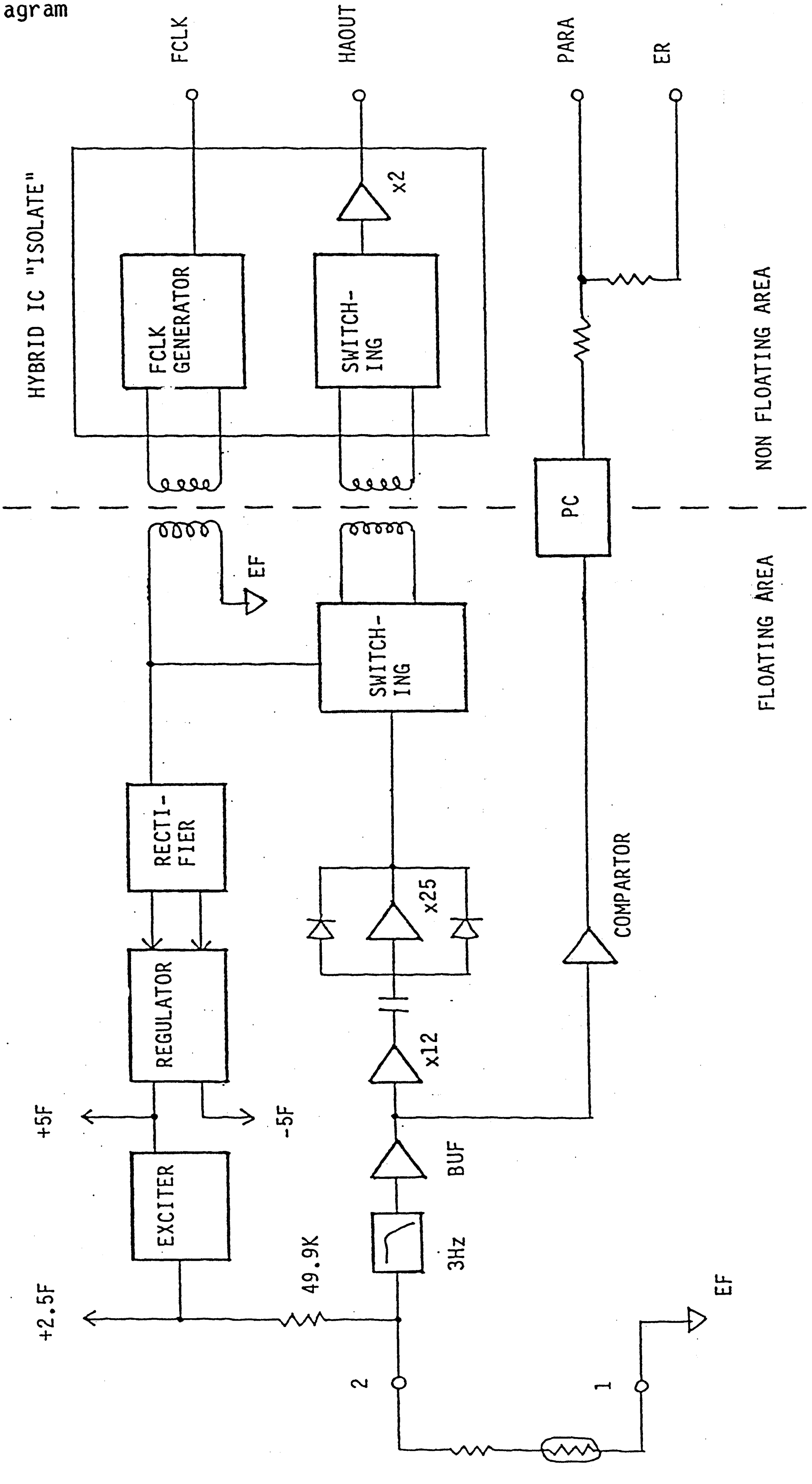
3) Adjust the VR001 so that the voltmeter reads DC ±10mV.

CNS connector


1
20
DC ±10mV
DVM
19
37


9054825 S
UP-
0582
88.10
JAPAN
IC03
IC05
IC06
IC07
IC08
IC01
IC02
IC04
CH02
CH03
CH01
T01
T02
PC01
GA01
VR001

5.7.6 Block diagram


FCLK
HAOUT
PARA
ER
HYBRID IC "ISOLATE"
FCLK GENERATOR
SWITCH-ING
x2
NON FLOATING AREA
PC
FLOATING AREA
EF
SWITCH-ING
RECTI-FIER
REGULATOR
x25
COMPARTOR
x12
+5F
-5F
BUF
EXCITER
3Hz
49.9K
+2.5F
EF
2
1

5.8 Sa02 head amplifier (AL-800PA)

5.8.1 General

This unit has a function to detect the following four signals for calculation of % Sa02 (oxygen saturation).

R .... Transmitted red light intensity
ΔR .... Transmitted red light intensity variation (ΔR1 = ΔR2 x 8)

IR .... Transmitted InfraRed light intensity
ΔIR ...... Transmitted InfraRed light intensity variation (ΔIR1 = ΔIR2 x 8)

The Sa02 head amplifier composes of UP-0551 Main board and UP-0552 Sub board. Block diagram on page 16 shows major functions of each board.

1) UP-0551 Main board

Red light and infrared light are emitted from the two LED lamps alternatively at 1kHz interval which is controlled by LED control circuit. Transmitted light through the subject are detected and converted into voltages by a photo detector and an amplifier, amplified to a specified level of signal by an auto gain controller, and then transferred to the Sub board.

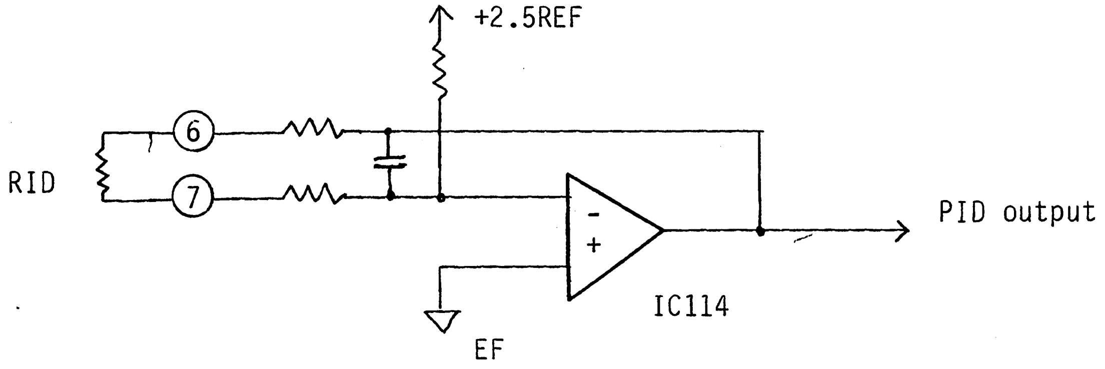
2) UP-0552 Sub board

Noise in the transmitted light signal from the Main board is reduced by a time sharing filter. Base hold circuit holds the signal level while there is no light emission to the -2.5V reference voltage (REF). R (Red light intensity signal) and IR (InfraRed light signal) are separately demodulated by two sample hold circuits and ΔR2 and ΔIR2 are outputted by AC amplifiers with auto inst (instantaneous baseline recovery) function. At the same time, ΔR1 and ΔIR1 are outputted by 8 time gain amplifiers. Finally these signals are converted into a time-shared signal by a multiplexer and then outputted through the UP-0551 Main board.

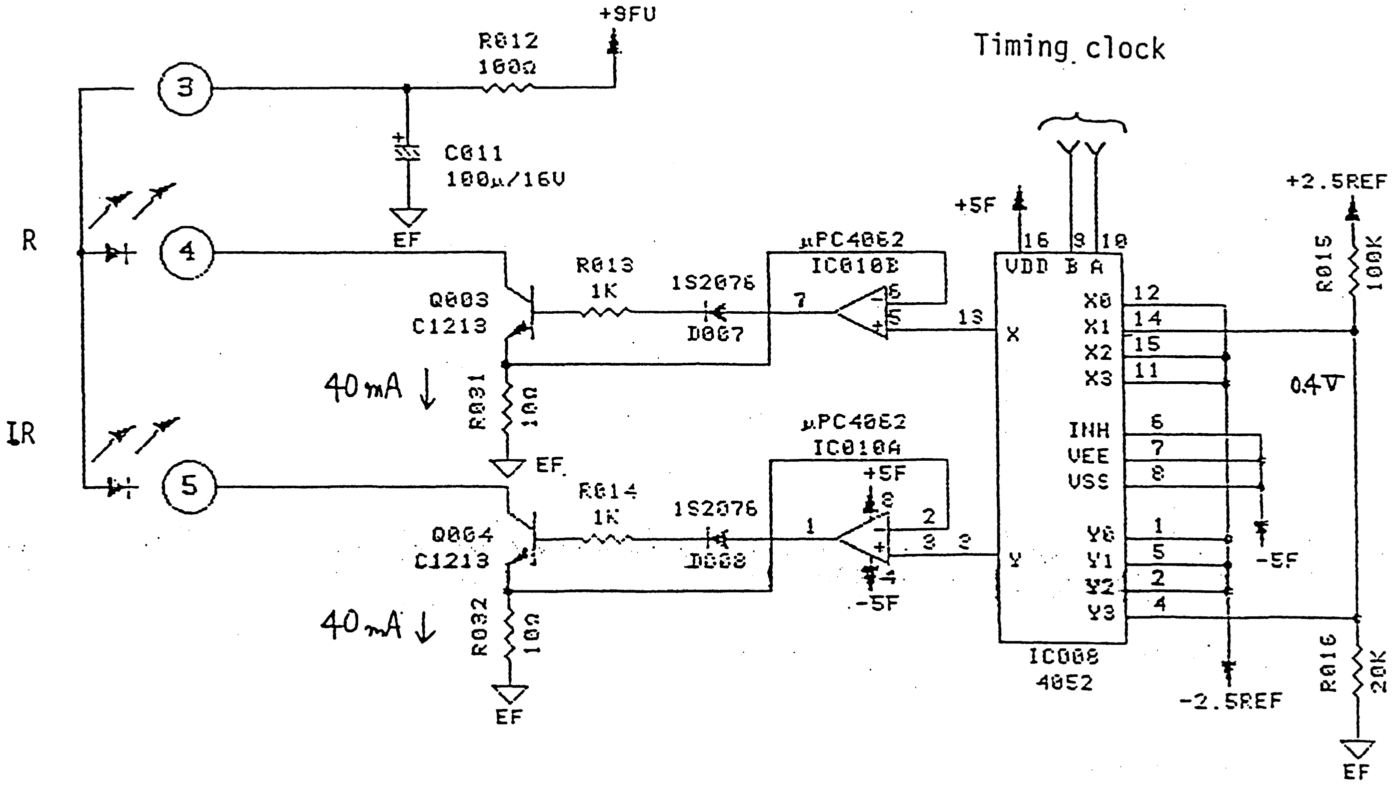
5.8.2 Probe ID amplifier

The probe ID amplifier compensates the variations of wavelength of light emitted from the LED lamps and also detects probe connection to the Sa02 head amplifier.

Each Sa02 probe has its own ID (determined by the RID) which is converted into voltage signal (PID: Probe ID).

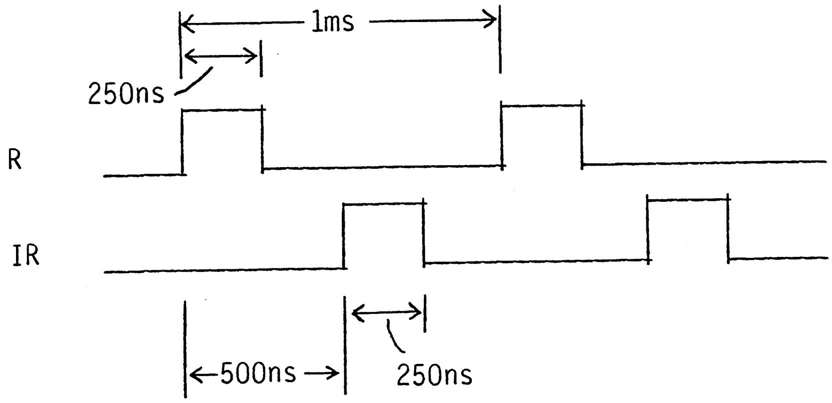


5.8.3 LED control circuit



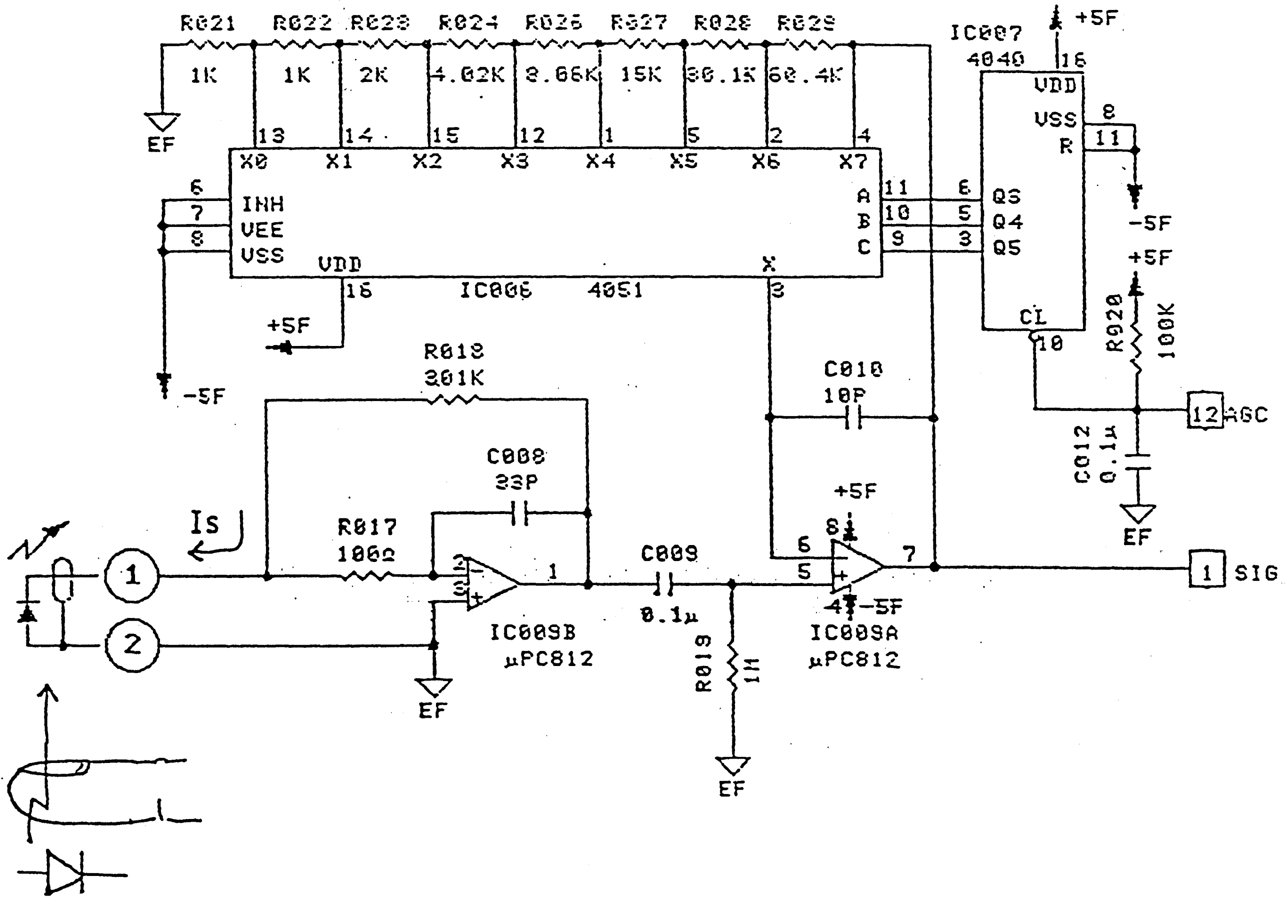
+9FU
R012
100Ω
Timing clock
C011
100μ/16V
EF
+5F
+2.5REF
R
IR
μPC4062
IC010B
R013
1K
1S2076
D007
Q003
C1213
40mA
R031
10Ω
EF
μPC4062
IC010A
+5F
R014
1K
1S2076
D008
Q004
C1213
-5F
40mA
R032
10Ω
EF
VDD
B
A
X
Y
X0
X1
X2
X3
INH
VEE
VSS
Y0
Y1
Y2
Y3
IC008
4052
R015
100K
0.4V
-5F
-2.5REF
R016
20K
EF

Red light and infrared light are emitted from the two LED lamps alternatively at 1kHz interval controlled by above LED control circuit. Peak current flow of each LED is 40mA.



1ms
250ns
R
IR
500ns
250ns

5.8.4 Input amplifier and auto gain control circuit


R021
R022
R023
R024
R026
R027
R028
R029
1K
1K
2K
4.02K
8.66K
15K
30.1K
60.4K
EF
13
14
15
12
1
5
2
4
X0
X1
X2
X3
X4
X5
X6
X7
6
7
8
INH
VEE
VSS
VDD
A
B
C
11
10
9
X
16
IC006
4051
3
+5F
-5F
IC007
4040
+5F
16
VDD
VSS
R
8
11
Q3
Q4
Q5
6
5
3
-5F
+5F
CL
10
R020
100K
C012
0.1µ
EF
12
AGC
1
SIG
C010
10P
R018
301K
C008
33P
Is
R017
100Ω
2
3
1
IC009B
µPC812
EF
C009
0.1µ
R019
1M
EF
+5F
8
6
5
7
4
-5F
IC009A
µPC812

Clock for auto gain

Transmitted light detected by the photodiode and the detection current "Is" is converted into voltage signal by the amplifier and the feedback resistor R018.

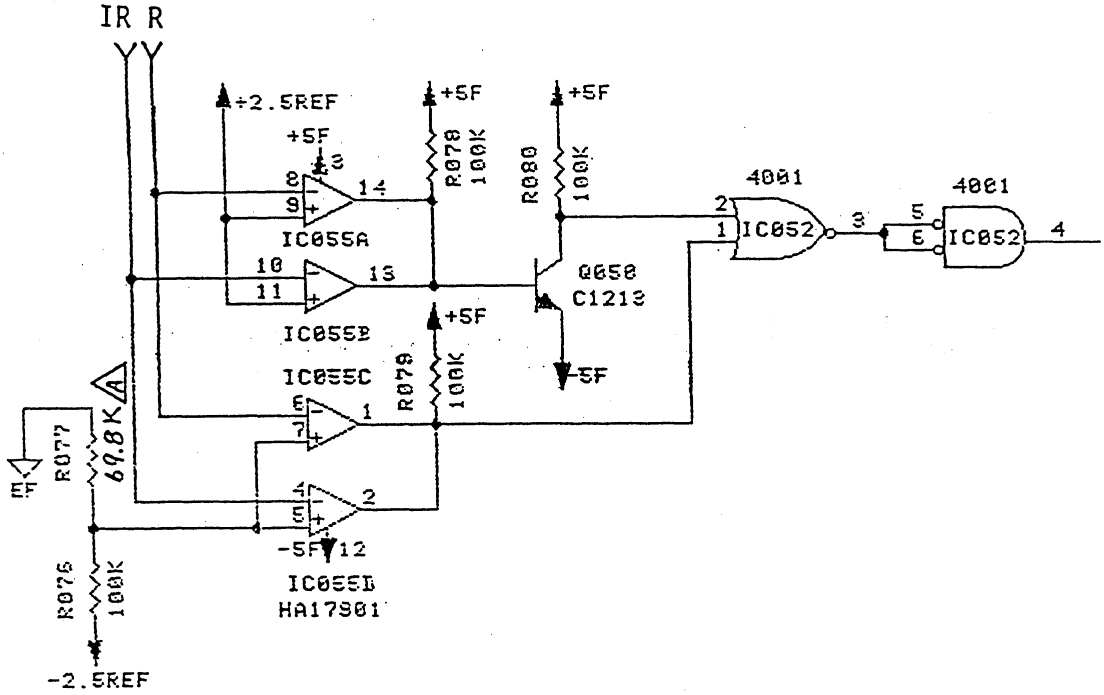
After being DC cut by the capacitor C009, voltage signal is amplified to a specified level by the auto gain control circuit consists of the IC switch IC006 and resistors.

AGC (Auto Gain Clock singal) stops which is triggered by the auto gain control circuit when R or IR signal comes into a specified range.

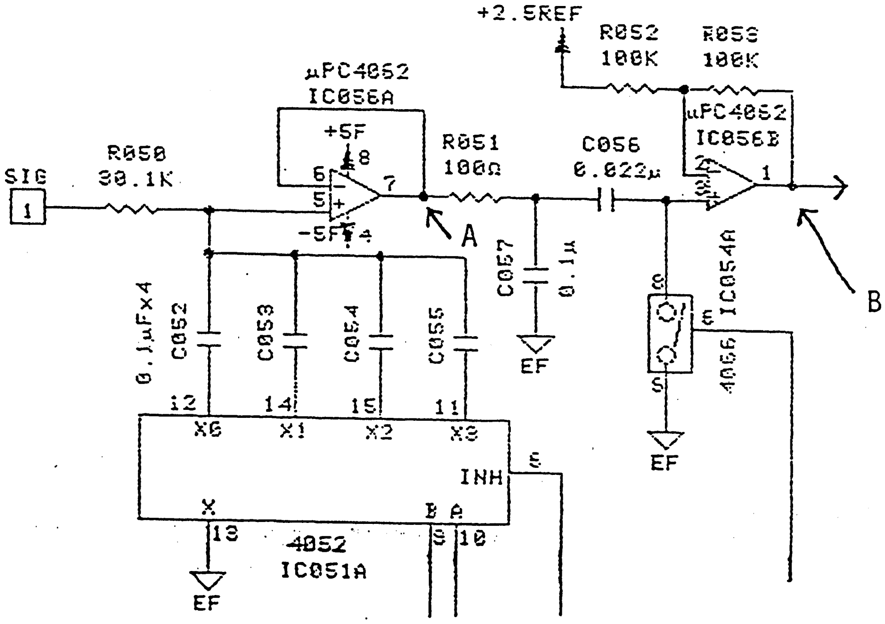
5.8.5 Comparator for auto gain control

The comparator controls the AGC (Auto Gain Clock signal) on/off or the auto gain control circuit.

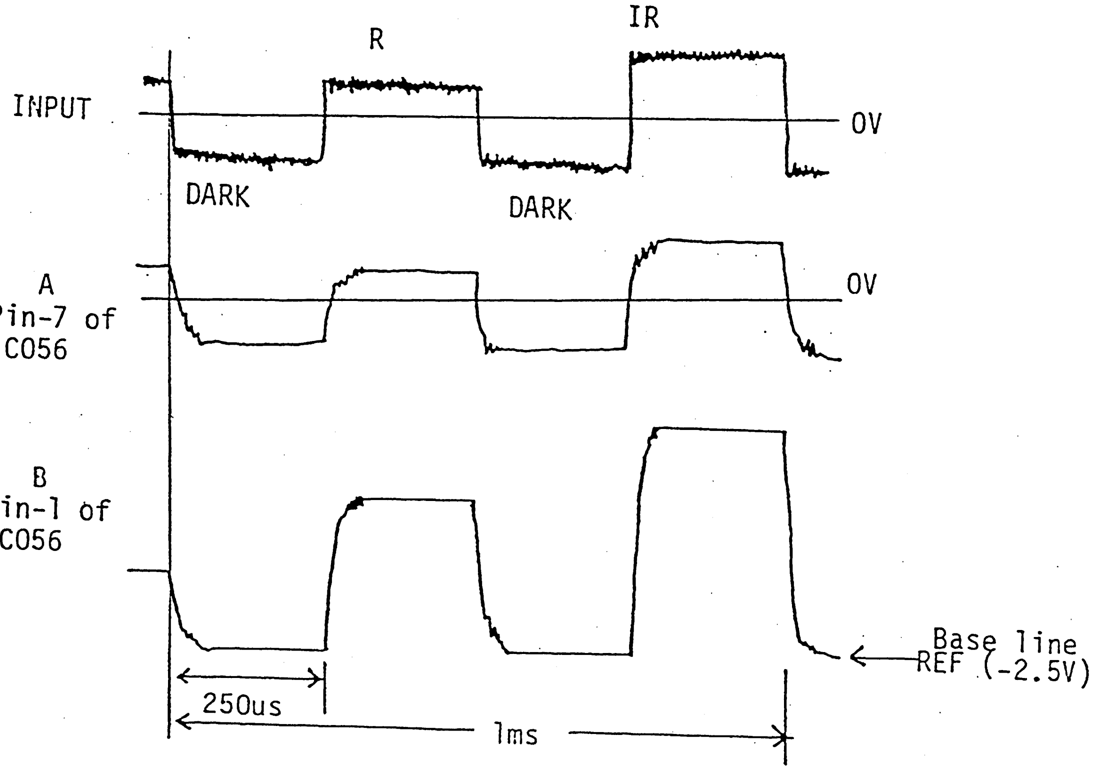
When either R or IR signal comes into a range from -1V to +2.5V, the output pin-4 of the IC052 turns to LOW to stop the AGC signal.


IR R
+2.5REF
+5F
+5F
+5F
IC055A
IC055B
IC055C
IC055D
HA17901
R078 100K
R080 100K
R079 100K
Q050 C1213
-5F
4001
4001
IC052
IC052
R077 69.8K
EF
R076 100K
-2.5REF
-5F
1
2
3
4
5
6
7
8
9
10
11
12
13
14

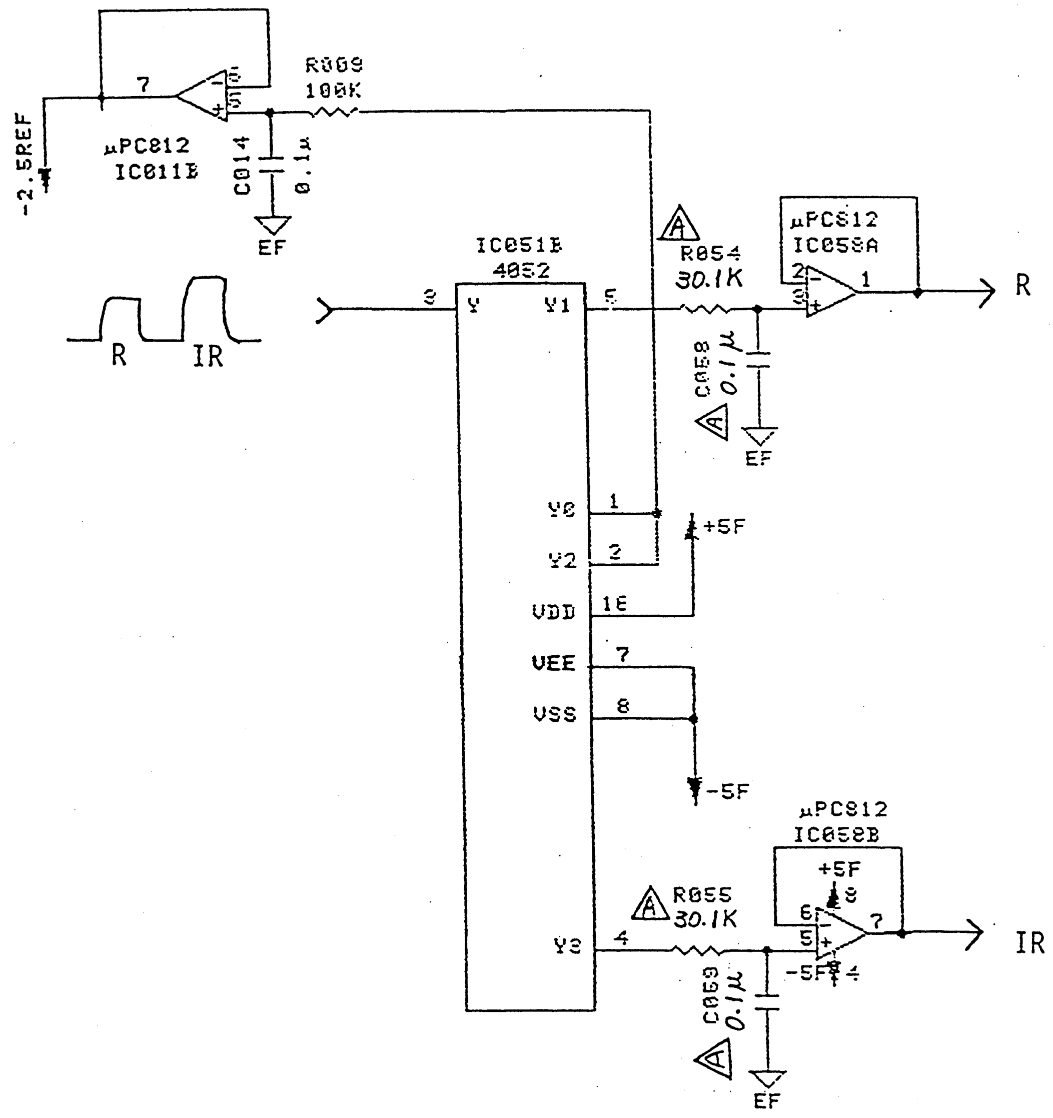
5.8.6 Time sharing filter with base hold circuit (Sub board)


+2.5REF
R052
100K
R053
100K
μPC4052
IC056A
+5F
8
6
5
7
-5F
4
R051
100Ω
C056
0.022μ
μPC4052
IC056B
2
3
1
SIG
1
R050
30.1K
A
B
C057
0.1μ
EF
0.1μFx4
C052
C053
C054
C055
12
14
15
11
X0
X1
X2
X3
INH
6
X
B A
13
9
10
4052
IC051A
EF
IC054A
4066
8
6
9
EF

This circuit reduces noise component in the signal from the Main board and holds the baseline (signal level while there is light emission) of the signal to -2.5V reference voltage (REF).

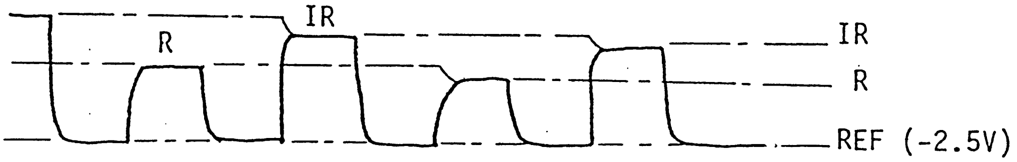


5.8.7 Sample hold circuit



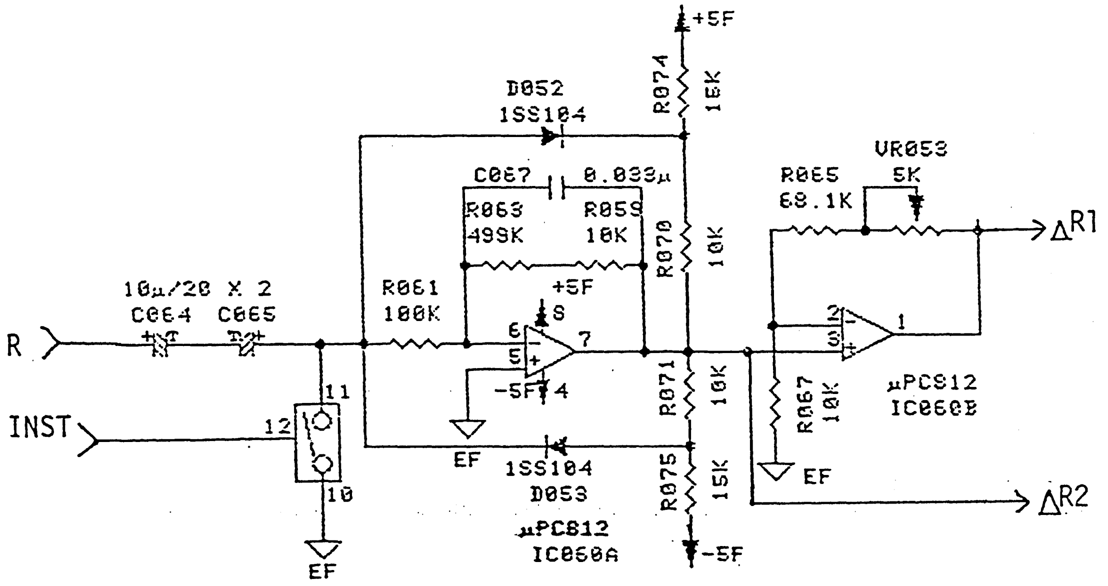
R009
100K
-2.5REF
μPC812
IC011B
C014
0.1μ
EF
R
IR
IC051B
4052
Y
Y1
Y0
Y2
VDD
VEE
VSS
Y3
R054
30.1K
C058
0.1μ
μPC812
IC058A
R
+5F
-5F
μPC812
IC058B
R055
30.1K
C059
0.1μ
IR

This circuit sample holds the R, IR, and REF (baseline) signals of the base held signal as below:



IR
R
IR
R
REF (-2.5V)

5.8.8 AC amplifier with auto inst function


+5F
R074
16K
D052
1SS104
C067
0.033μ
R063
499K
R059
10K
R070
10K
VR053
5K
R065
68.1K
ΔR1
10μ/20 X 2
C064
C065
R061
100K
+5F
8
6
5
7
4
-5F
R
INST
11
12
10
EF
EF
1SS104
D053
μPC812
IC060A
-5F
R071
10K
R075
15K
2
3
1
R067
10K
μPC812
IC060B
EF
ΔR2

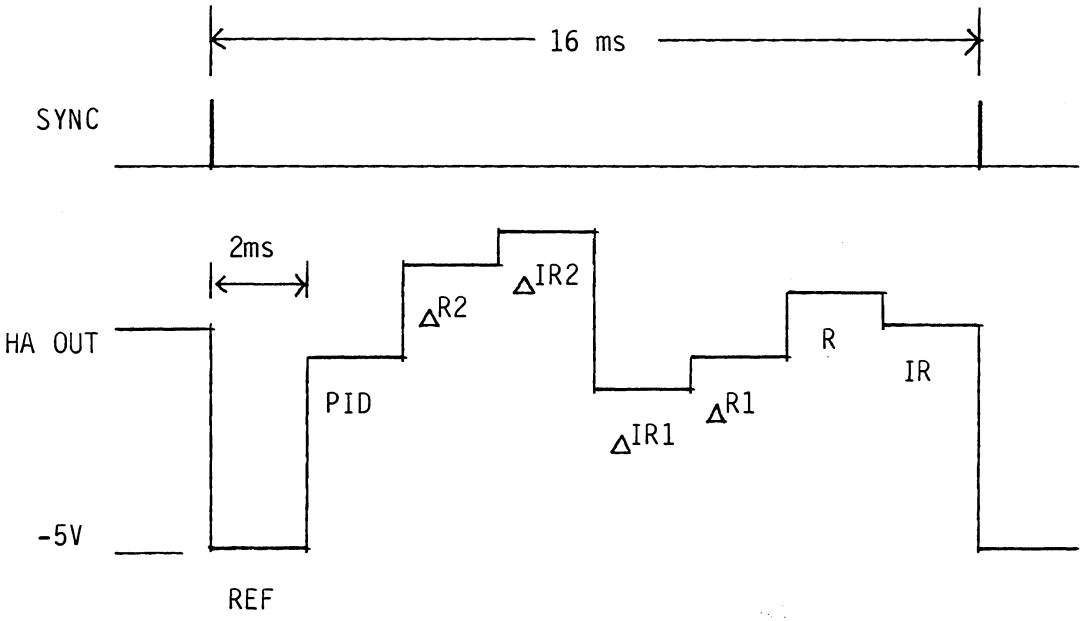
After being DC cut by the capacitors C062 and C063, the sample-held R signal is 5 times amplified by the IC059A to be the ΔR2 signal.

The diodes D050 and D051 recover the baseline when the signal level is saturated in the circuit (auto inst function).

The analog switch IC054B shortens the input line of the amplifier IC059A during auto gain control so that the signal level can quickly recover after the auto gain control is released. ΔR2 signal is 8 times amplified by the IC059B into the ΔR1 signal.

Above operations are applied to the IR singal in the same manner applied to the R signal.

5.8.9 Output timing


16 ms
SYNC
2ms
HA OUT
-5V
REF
PID
ΔR2
ΔIR2
ΔIR1
ΔR1
R
IR

5.8.10 Adjustment

Volume on the PC boards are for gain adjustment of amplifiers. If you replace resistors concerning amplification gain, volumes should be readjusted.

There is no need to adjust the volumes when IC chips are replaced.

5.9 CO2 head amplifier (AG-800PA)

5.9.1 General

AG-800PA is one of the head amplifiers for the BSM-8500 series bedside monitors to measure CO2 partial pressure of expired gas of a patient with TG-706P CO2 sensor.

5.9.2 Description of each function block

1) UP-0588 CO2 Main board

Power (DC-DC) line is a power to drive the CO2 sensor TG-706P and DRIVER is a electrical current driver of a motor in the sensor.

S-P and D/A circuit reads the linearizer data (compensation factor for CO2 calculation, differs in each sensor) which written in the ROM in the sensor.

TIMING CONTL 1 circuit controls output timing for reading linearizer data, and HAOUT output timing.

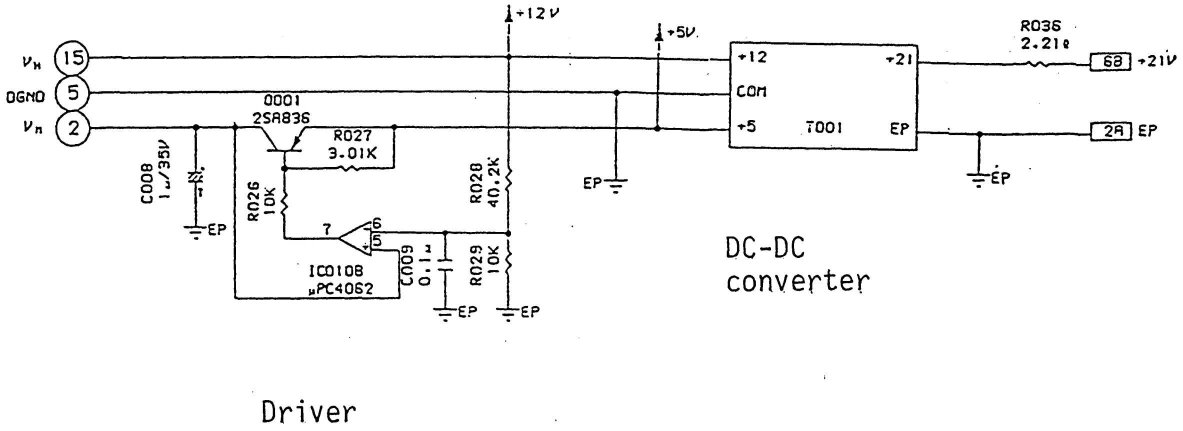
2) UP-0589 CO2 Sub board

ZERO SHIFT circuit shifts the V_{AC} sensor signal baseline to -5REF (-4.75V) in order to widen dynamic range of the signal.

P/H (peak-hold) circuit holds amplitude of the signal based on -5REF reference voltage.

3.75S/H (Sample and hold) and 4.3S/H circuits sample each V3.7 signal and V4.3 signal in the V_{AC} signal.

- Sensor driver power (DC-DC, DRIVER on C02 Main board)

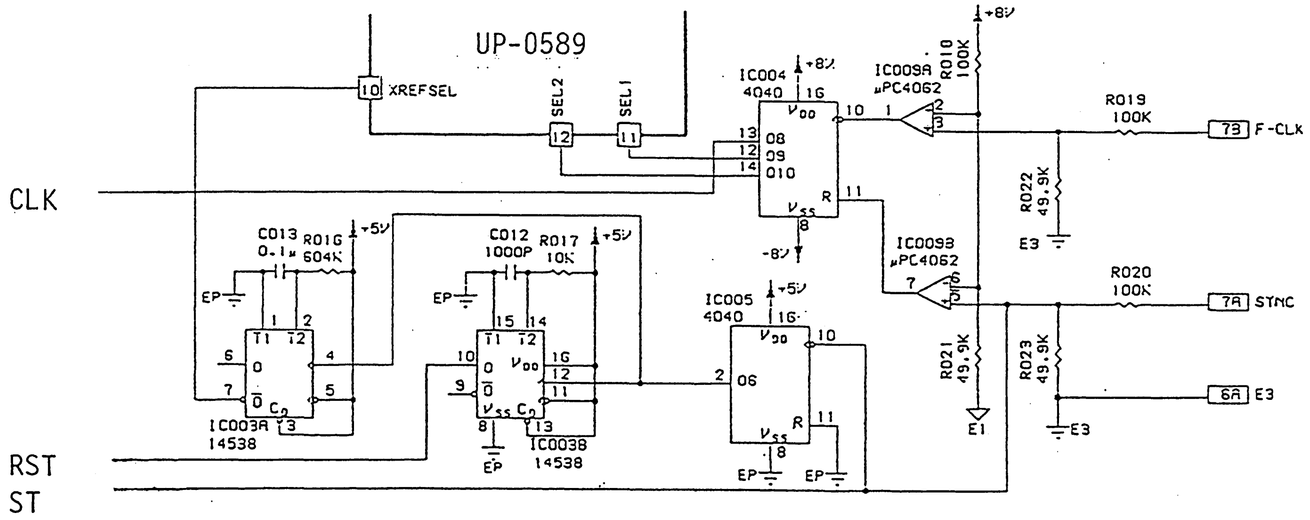

+12V
+5V.
VH 15
OGND 5
VH 2
C008 1μ/35V
EP
Q001 2SA836
R027 3.01K
R026 10K
7
6
5
IC0108 μPC4062
C009 0.1μ
R028 40.2K
R029 10K
EP
EP
EP
+12
COM
+5
T001
+21
EP
EP
R036 2.21Ω
6B +21V
2A EP
DC-DC converter
Driver

- DC-DC (T001) is a DC-DC converter that generates +12V and +5V voltages from +21V unregulated power.

  +12V is a power for an infrared ray lamp in the C02 sensor of 120mA continuous load current and +12V ±1% stability.

  +5V drives a motor and digital IC devices in the sensor. The circuit indicated with DRIVER drives the motor.

. TIMING CNTL 1 (C02 Main board)


UP-0589
10 XREFSEL
SEL2
SEL1
12
11
IC004 4040
+8V
16
VDD
13 O8
12 O9
14 O10
R 11
VSS 8
-8V
10
IC009A μPC4062
1
2
3
R010 100K
+8V
R019 100K
7B F-CLK
R022 49.9K
E3
IC009B μPC4062
7
5
6
R020 100K
7A SYNC
R021 49.9K
R023 49.9K
E1
6A E3
E3
CLK
C013 0.1μ
R016 604K
+5V
EP
1 2
T1 T2
6 Q
7 Q̄
4
5
Cn
IC003A 3
14538
C012 1000P
R017 10K
+5V
EP
15 14
T1 T2
10 Q VDD 16
9 Q̄
12
11
VSS Cn
8
13
IC003B 14538
EP
IC005 4040
+5V
16
VDD
10
2 O6
R 11
VSS
8
EP EP
RST
ST

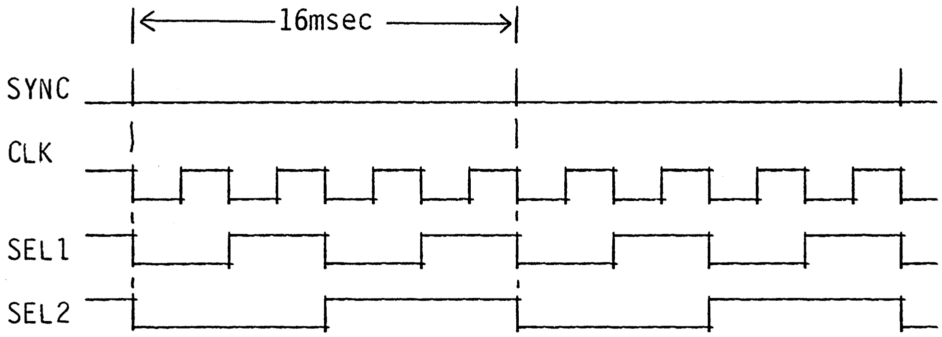
. SEL1, SEL2 ...... Clock signals to control HAOUT signal output timing.

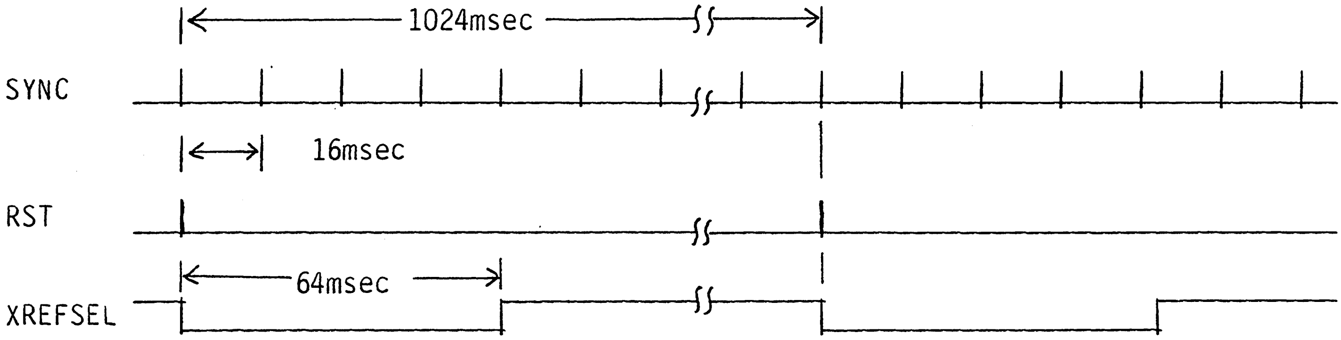
. XREFSEL .... Control signal to output data to HAOUT by switching -5REF signal and linearizer data.

. CLK .... Clock signal to control ROM and S/P (Serial to Parallel) converter in the sensor.

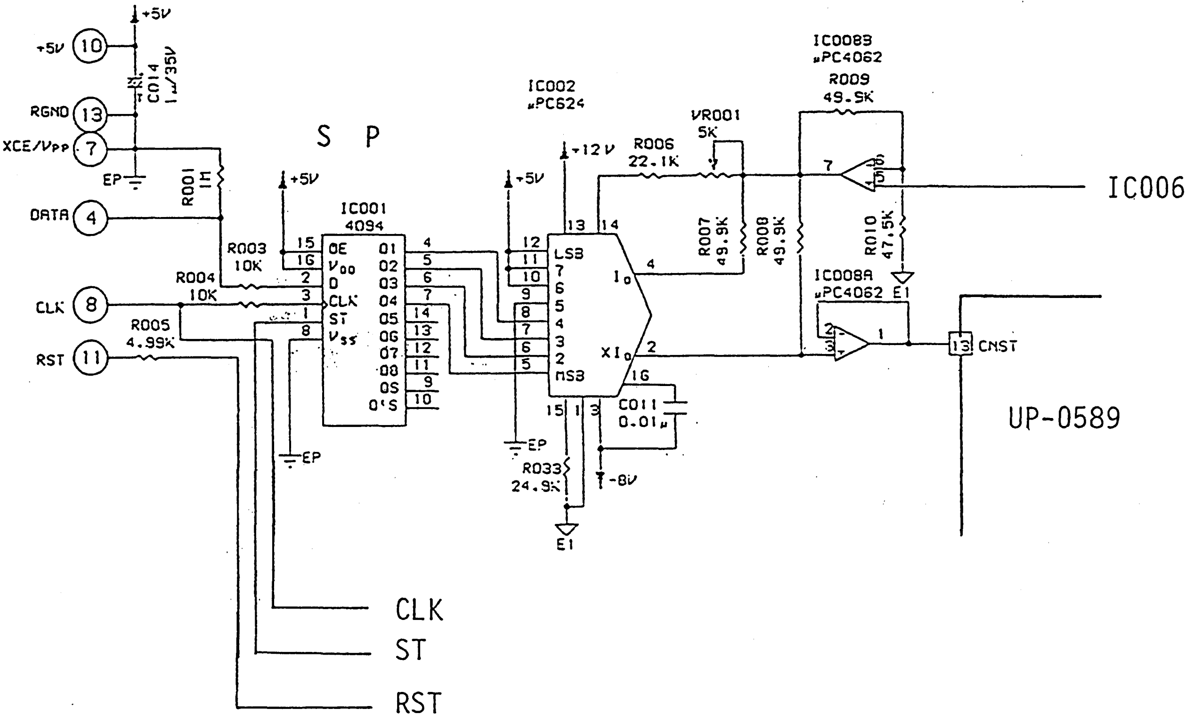
. RST .... Signal to reset the ROM in the sensor.

. ST .... Signal to control S/P conversion.


16msec
SYNC
CLK
SEL1
SEL2


1024msec
SYNC
16msec
RST
64msec
XREFSEL

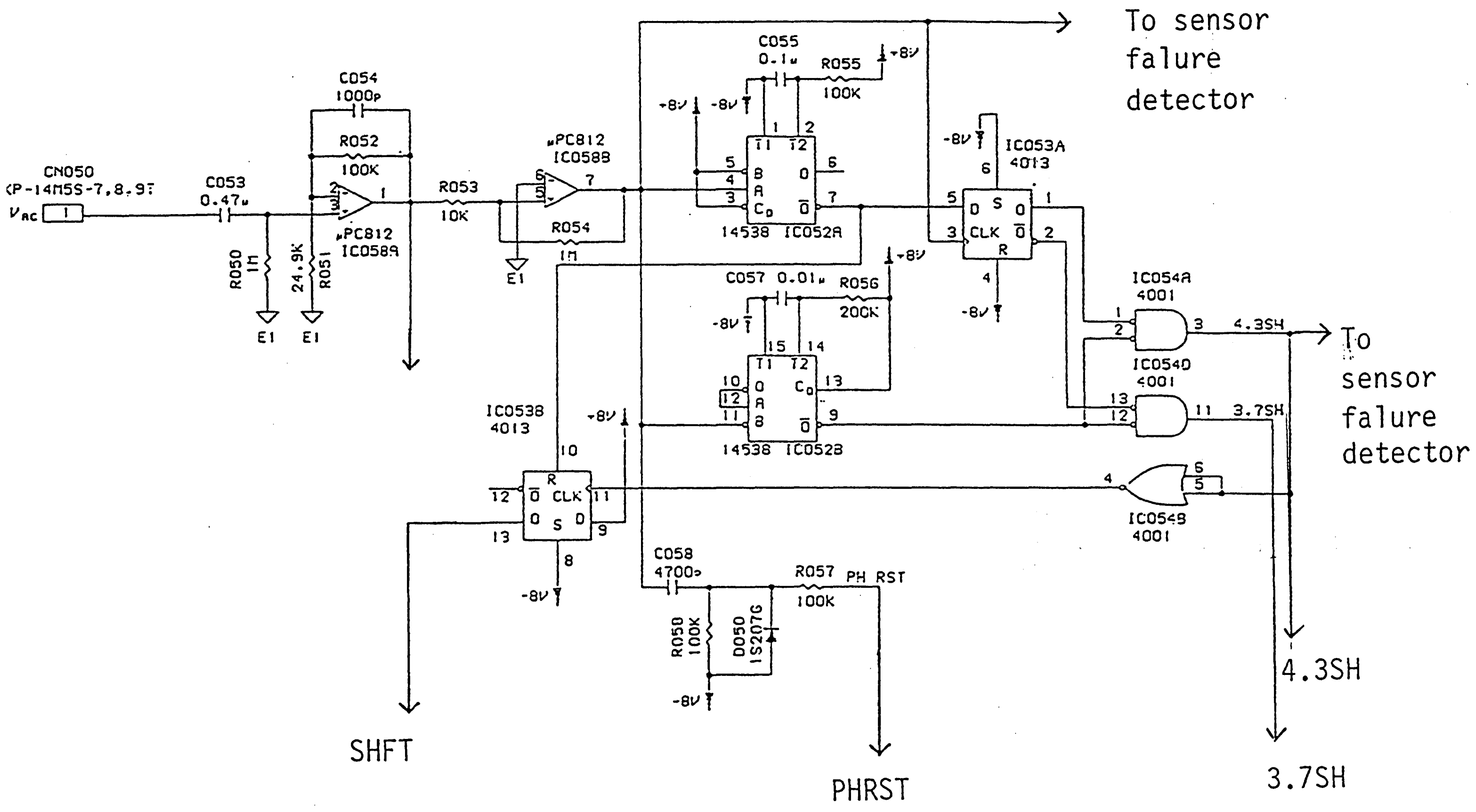
. S/P conversion and D/A conversion (C02 Main board)


+5V
+5V (10)
RGND (13)
XCE/VPP (7)
EP
DATA (4)
CLK (8)
RST (11)
C014 1μ/35V
R001 1M
R003 10K
R004 10K
R005 4.99K
S P
+5V
IC001 4094
OE
VDD
D
CLK
ST
VSS
O1
O2
O3
O4
O5
O6
O7
O8
OS
O'S
EP
IC002 μPC624
+12V
+5V
LSB
MSB
Io
XIo
EP
R033 24.9K
E1
C011 0.01μ
-8V
R006 22.1K
VR001 5K
R007 49.9K
R008 49.9K
IC008B μPC4062
R009 49.9K
R010 47.5K
IC008A μPC4062
E1
CNST
IC006
UP-0589
CLK
ST
RST

Linearizer data (DATA) stored in the ROM in the sensor is output from the ROM in synchronization with CLK signal in serial format data. This serial format data is S/P converted into parallel format data in synchronization with ST signal. Relation between the linearizer data and D/A output is as below.

Linearizer data	D/A out (V)	Linearizer data	D/A out (V)
0 0 0 0	-4.80	1 0 0 0	+0.32
0 0 0 1	-4.16	1 0 0 1	+0.96
0 0 1 0	-3.52	1 0 1 0	+1.60
0 0 1 1	-2.88	1 0 1 1	+2.24
0 1 0 0	-2.24	1 1 0 0	+2.88
0 1 0 1	-1.60	1 1 0 1	+3.52
0 1 1 0	-0.96	1 1 1 0	+4.16
0 1 1 1	-0.32	1 1 1 1	+4.80

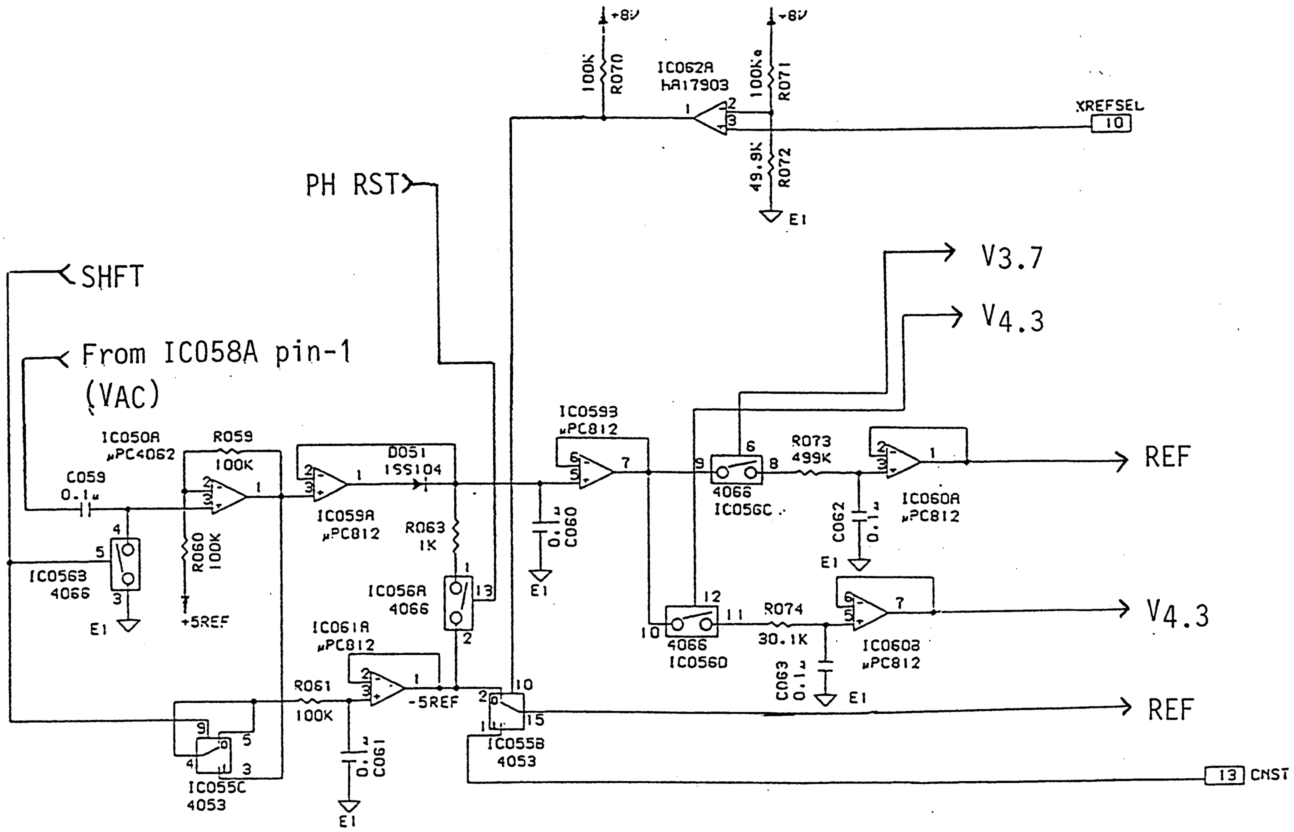
. TIMING CONTL 2 (CO2 Sub board)


CN050
KP-14M5S-7,8,9T
VAC 1
C053
0.47u
C054
1000p
R052
100K
R050
1M
24.9K
R051
uPC812
IC058A
E1
E1
R053
10K
uPC812
IC058B
R054
1M
E1
C055
0.1u
R055
100K
-8V
T1 T2
B Q
A
CD Q̄
14538 IC052A
C057 0.01u
R056
200K
15 14
14538 IC052B
IC053A
4013
D S Q
CLK Q̄
R
IC054A
4001
4.3SH
IC054D
4001
3.7SH
IC054B
4001
IC053B
4013
C058
4700p
R057
100K
PH RST
R050
100K
D050
1S2076
To sensor falure detector
To sensor falure detector
SHFT
PHRST
4.3SH
3.7SH

. SHFT	Control signal to shift V_{AC} signal baseline in the ZERO SHIFT circuit to -5REF (-4.75V) level.
. PH RST	Pulse to reset Peak-Hold circuit following the ZERO SHIFT circuit.
. 3.7SH	Sampling pulse of V3.7 signal in the V_{AC} singal.
. 4.3SH	Sampling pulse of V4.3 signal in the V_{AC} singal.

Refer to page for CO2 signal demodulation timing.

. V3.7, V4.3 and REF signal detection circuit (C02 Sub board)

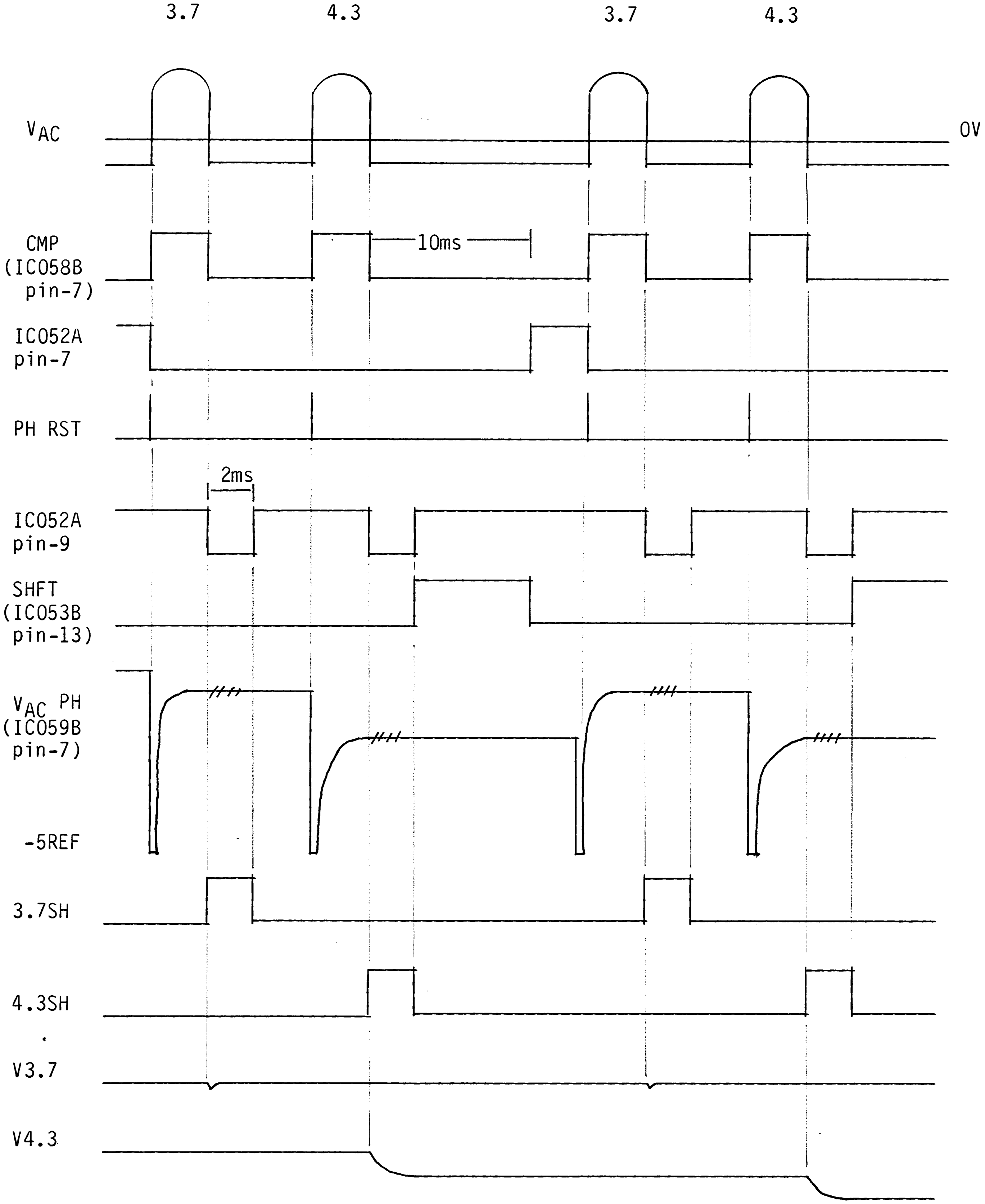


+8V
+8V
100K
R070
IC062A
HA17903
100K
R071
XREFSEL
10
49.9K
R072
E1
PH RST
V3.7
V4.3
SHFT
From IC058A pin-1
(VAC)
IC059B
μPC812
IC050A
μPC4062
R059
100K
C059
0.1μ
D051
1SS104
IC059A
μPC812
R063
1K
0.1
C060
E1
R073
499K
4066
IC056C
C062
0.1
IC060A
μPC812
REF
IC0563
4066
R060
100K
E1
+5REF
IC056A
4066
IC061A
μPC812
R061
100K
-5REF
0.1
C061
E1
IC055C
4053
IC055B
4053
4066
IC056D
R074
30.1K
C063
0.1
E1
IC060B
μPC812
V4.3
REF
13
CNST

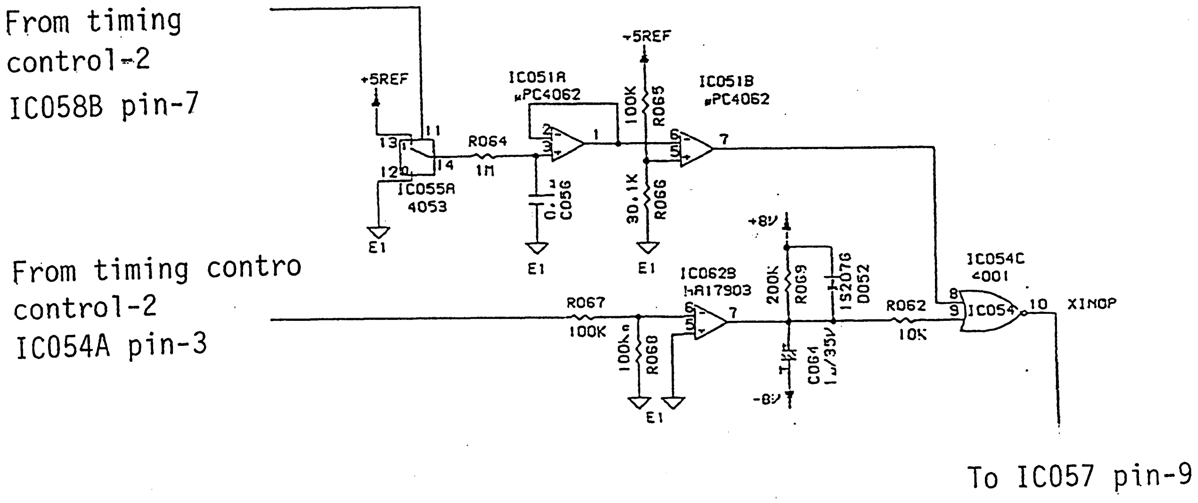
VAC signal baseline is shifted (IC050A pin-1) into -5REF signal (IC061A pin-1) by SHFT pulse. CNST signal is D/A converted lenearizer data. This CNST and -REF signal output as REF signal by switching CNST signal and -5REF signal by XRESET signal.

The IC059A peak-holds the amplitude of V_{AC} signal based on -5REF signal and the IC060A and IC060B sample hold V3.7 and V4.3 signals composing of V_{AC} signal and output the signals as V3.7 and V4.3.

. CO2 signal demodulation timing


3.7
4.3
3.7
4.3
VAC
0V
CMP (IC058B pin-7)
10ms
IC052A pin-7
PH RST
2ms
IC052A pin-9
SHFT (IC053B pin-13)
VAC PH (IC059B pin-7)
-5REF
3.7SH
4.3SH
V3.7
V4.3

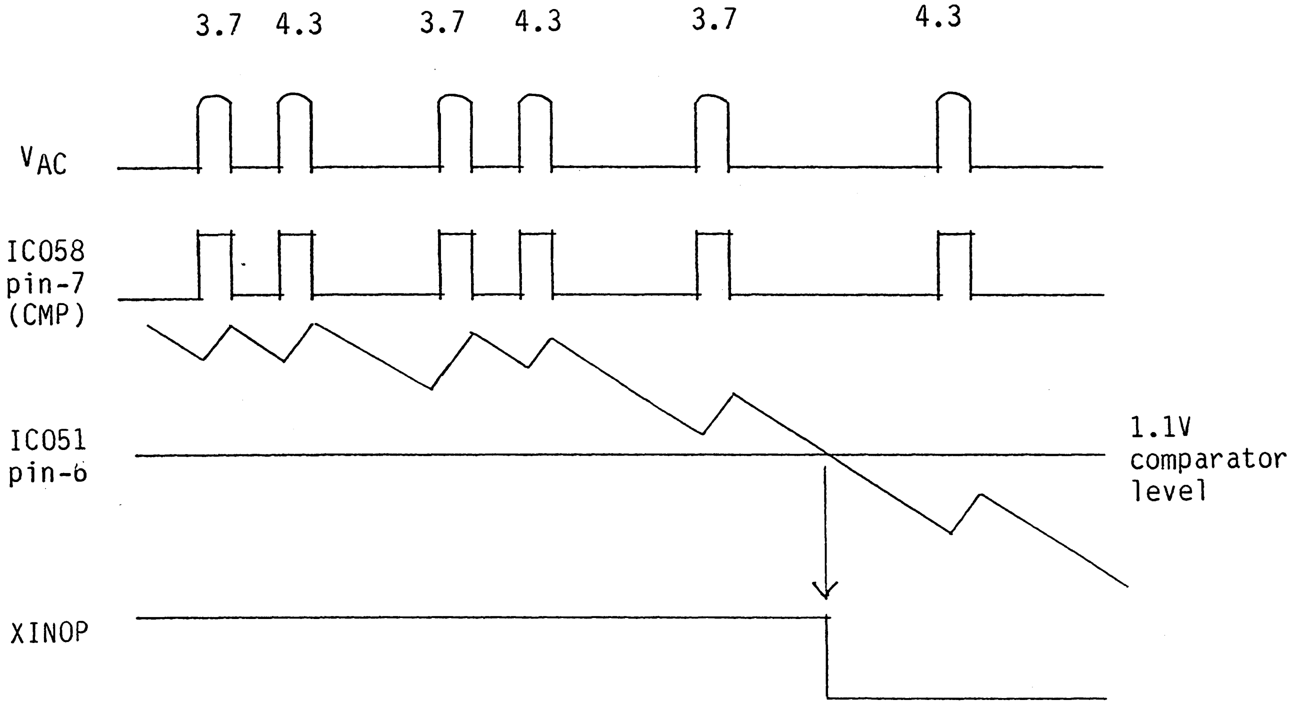
. Operation of sensor failure detection


From timing
control-2
IC058B pin-7
From timing contro
control-2
IC054A pin-3
+5REF
IC055A
4053
13
12
11
14
E1
R064
1M
IC051A
μPC4062
2
3
1
C056
0.1
E1
+5REF
100K
R065
30.1K
R066
E1
IC051B
μPC4062
6
5
7
+8V
IC062B
HA17903
R067
100K
100K
R068
E1
6
5
7
200K
R069
1S2076
D052
C064
1μ/35V
-8V
R062
10K
IC054C
4001
8
9
IC054
10
XINOP
To IC057 pin-9

In normal operation, both IC054 pin-8 and piun-9 are "L" (-8V) logic level and pin-10 XINOP (Inoperative) output is "H" level.

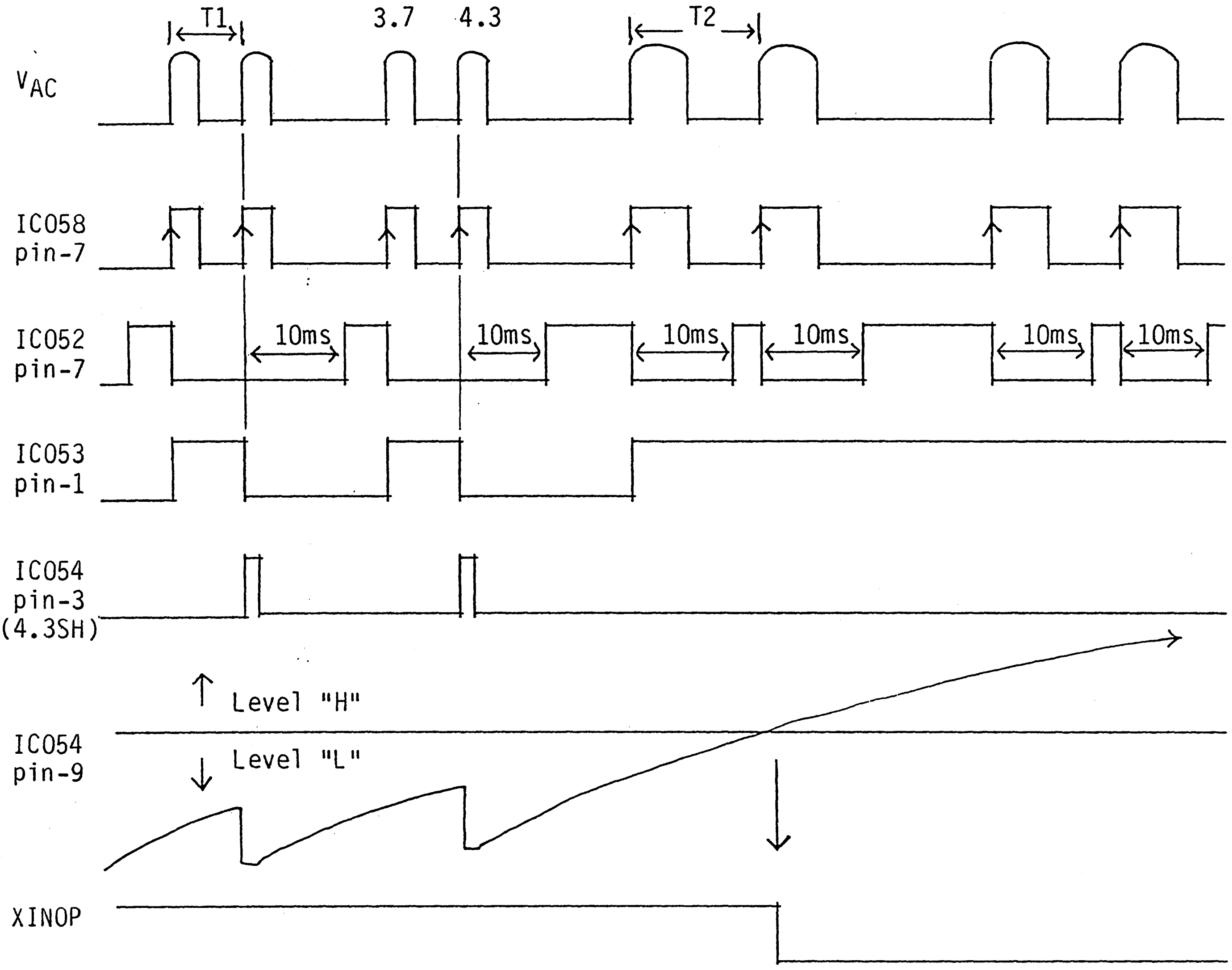
a) When there is no 3.7 or 4.3 or both in the V_{AC} signal

When there is no 3.7 or 4.3 or both in the V_{AC} signal, CMP pulse is not generated or number of pulses decreases to half, and charging time of the C056 becomes short, then the comparator (IC051B) outputs "H" level and XINOP signal becomes "L". The head amplifier output signal HAOUT is -5V in this condition.


3.7
4.3
3.7
4.3
3.7
4.3
VAC
IC058
pin-7
(CMP)
IC051
pin-6
1.1V
comparator
level
XINOP

b) When the V_{AC} output interval is prolonged (decrease of motor revolution)

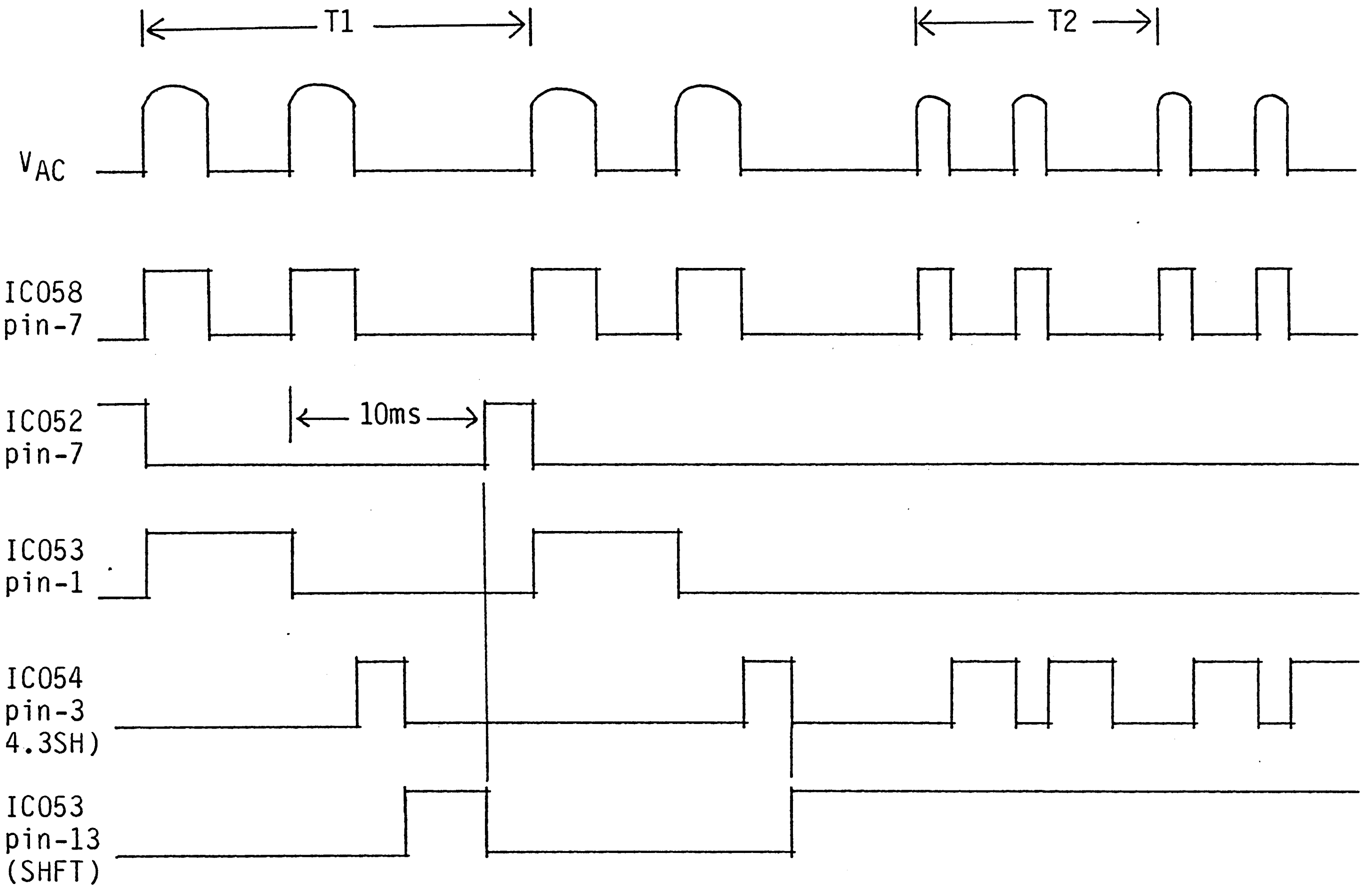
When the V_{AC} output interval T1 between 3.7 and 4.3 is prolonged it exceeds 10msec of one-shot time of IC052A, output of the IC053A (pin-1) becomes always "H" and the C064 is charged up by +8V, then XINOP singal turns to "L" and HAOUT head amplifier output becomes -5V.



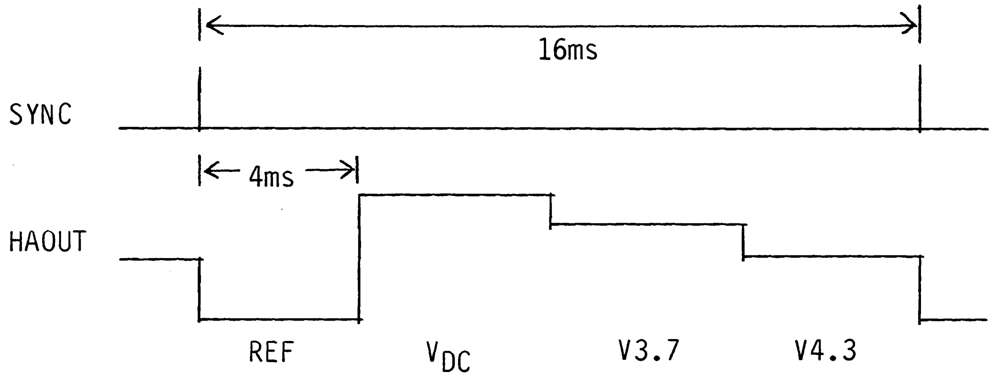
T1
3.7
4.3
T2
V_{AC}
IC058 pin-7
IC052 pin-7
10ms
10ms
10ms
10ms
10ms
10ms
IC053 pin-1
IC054 pin-3 (4.3SH)
Level "H"
Level "L"
IC054 pin-9
XINOP

c) When the V_{AC} output interval is shortened (increase of motor revolution)

When the interval T2 between the 3.7 and next 3.7, it becomes shorter than 10msec one-shot time of the iC052A IC052A output (pin-7) becomes "L" and SHFT pulse (IC053 pin-13 is fixed to "H". Then IC050A input pin-3 is fixed to E1 (ground) and head amplifier output HA4.3 becomes equal to -5REF voltage.

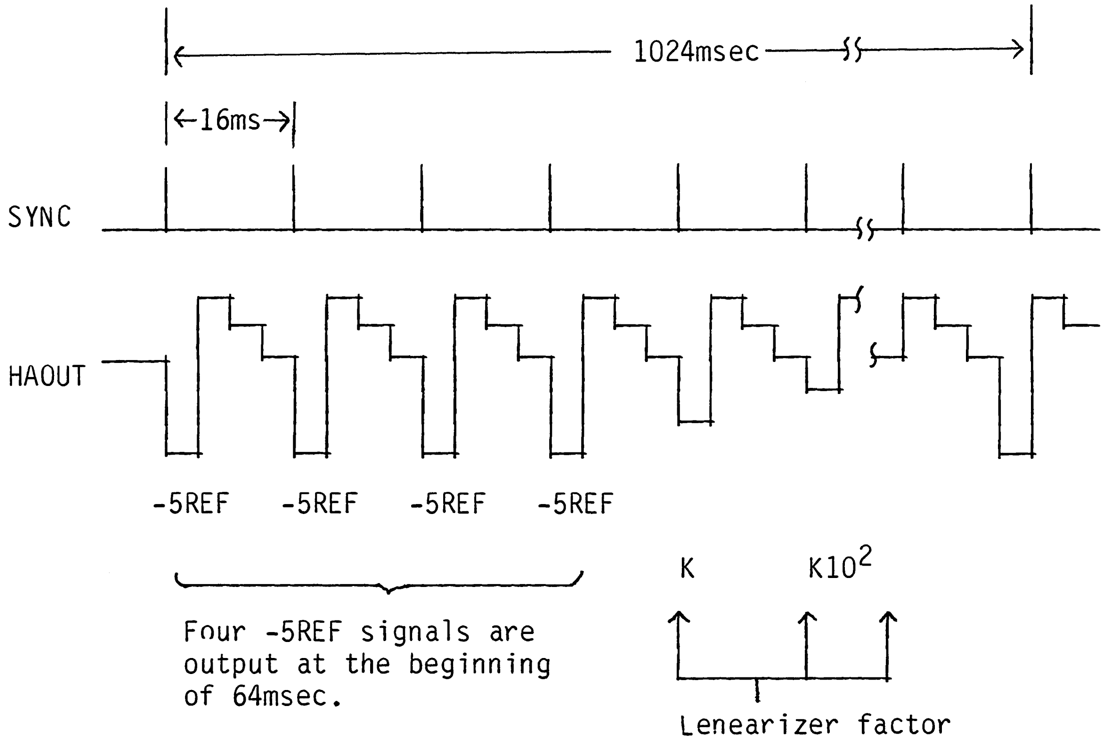

T1
T2
V_{AC}
IC058 pin-7
IC052 pin-7
10ms
IC053 pin-1
IC054 pin-3 (4.3SH)
IC053 pin-13 (SHFT)

. Timing of output signal

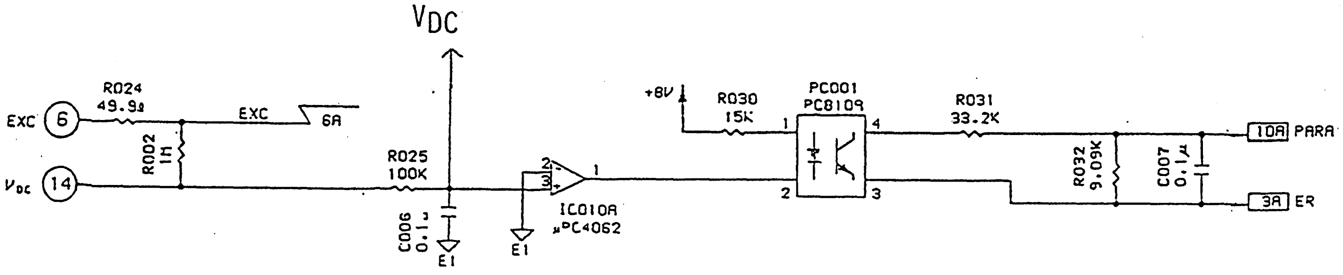

16ms
SYNC
4ms
HAOUT
REF
V_{DC}
V3.7
V4.3

REF: -REF signal which is a reference of V3.7 and V4.3 signals and linearizer data of each sensor required for CO2 calculation are output for 4msec from the SYNC pulse every 16msec in a cycle of 1204msec.

-5REF output range: -4.75V ± 0.2V


1024msec
16ms
SYNC
HAOUT
-5REF
-5REF
-5REF
-5REF
K
$K10^2$
Four -5REF signals are output at the beginning of 64msec.
Lenearizer factor

. Unit discrimination signal (PARA voltage)


VDC
R024
49.9Ω
EXC
6
EXC
6A
R002
1M
V_{DC}
14
R025
100K
C006
0.1µ
E1
2
3
1
E1
IC010A
µPC4062
+8V
R030
15K
PC001
PC8109
1
2
4
3
R031
33.2K
R032
9.09K
C007
0.1µ
10A
PARA
3A
ER

PARA (parameter) voltage changes when the CO2 sensor is connected and disconnected as below.

Sensor	PARA voltage (V)
Connection	2.40 ±0.05
Disconnection	2.10 ±0.05

When the sensor is not connected, EXC (-5V) is applied to the comparator input terminal (IC101A pin-3) and comparator output is "L". With this voltage, the photocoupler PC001 is conductive and 2.1V voltage attenuated with R031 and R032 resistors appears as PARA voltage at no sensor connection.

When the sensor is connected, +1V to +5V voltage is applied to the comparator input terminal (IC101A pin-3) and comparator output turns to "H". With this voltage PC001 becomes off and 2.4V appears as PARA voltage at sensor connection.

. Adjustment of the AG-800PA CO2 head amplifier

Basecally there is no need to adjust each component, however, when the IC002 D/A converter is replaced adjust the VR001.

Adjustment: VR001

1) Read DC voltage across the TP $\boxed{E1}$ (analog ground) and IC008 pin-8 with a digital voltmeter.
2) Disconnect the CO2 sensor and adjust the VR001 so that the voltmeter reads -4.8V ±0.01V.

5.9.3 CO2 sensor TG-706P

a) General

The infrared ray which is absorbed by CO2 gas (4.3um wavelength) and the infrared ray which is not affected by CO2 gas (3.7us wave length) are used in the CO2 sensor.

b) Sensor output signals

The CO2 sensor outputs three signals.

VDC ...... DC voltage for compensating signal drift due to temperature change of the sensor. It corresponds to resistor value of the infrared ray detector.

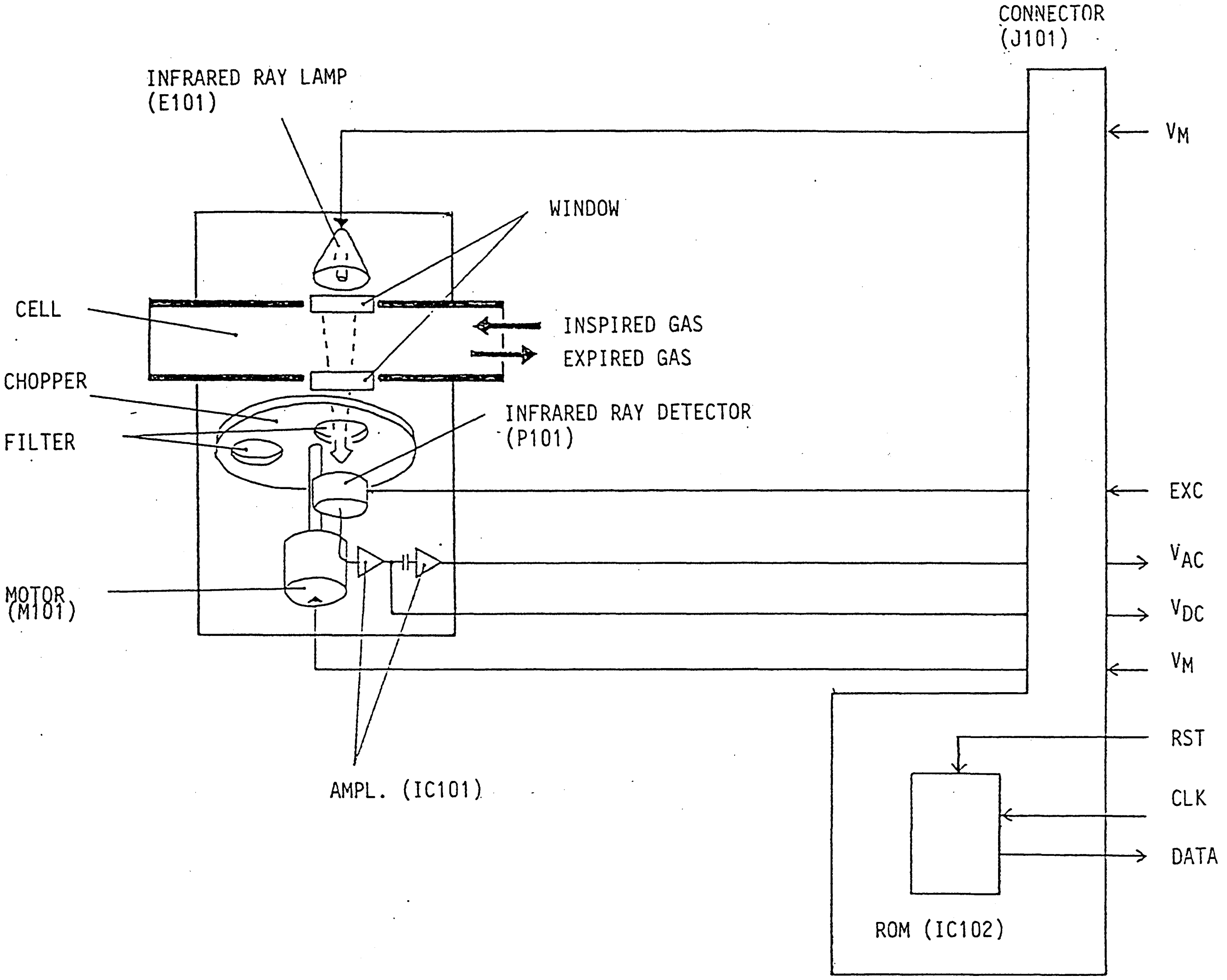
VAC ...... AC voltage of light strength signal. The infrared ray that passes through expiratory gas in the cell and the filter is converted into a light strength signal after being converted to a resistance signal and then to an electrical signal. One rotation of the chopper is taken to be one cycle, and the signal (V4.3) through the 4.3um filter (altered CO2 partial pressure) and the signal (V3.7) through the 3.7um filter (not affected by Co2 gas, used for reference), are output alternatively.

VAC singal is a mixture of the V4.3 and V3.7 signals.

DATA ..... Compensation coefficient to calculate CO2 value, 256 bit serial data stored in ROM chip inside each CO2 sensor.

c) Head amplifier output signals

The AG-800PA CO2 head amplifier separates V4.3 and V3.7 signals from VAC signal and outputs DATA, VDC, V3.7 and V4.3 signals in order successively.


CONNECTOR
(J101)
INFRARED RAY LAMP
(E101)
V_M
WINDOW
CELL
INSPIRED GAS
EXPIRED GAS
CHOPPER
FILTER
INFRARED RAY DETECTOR
(P101)
EXC
V_{AC}
MOTOR
(M101)
V_{DC}
V_M
RST
AMPL. (IC101)
CLK
DATA
ROM (IC102)

VDC ..... DC voltage indicating infrared ray detector resistance value.

VAC ..... AC voltage including V4.3 singal (altered by CO2 partial pressure) and V3.7 signal (not affeted by CO2 gas, used for reference).

DATA .... Compensation coefficient to calculate CO2 value, 256 bit serial data stored in ROM chip inside each CO2 sensor (linearizer data).

EXC ..... -5V ±2% power voltage to drive (excite) the infrared ray detector.

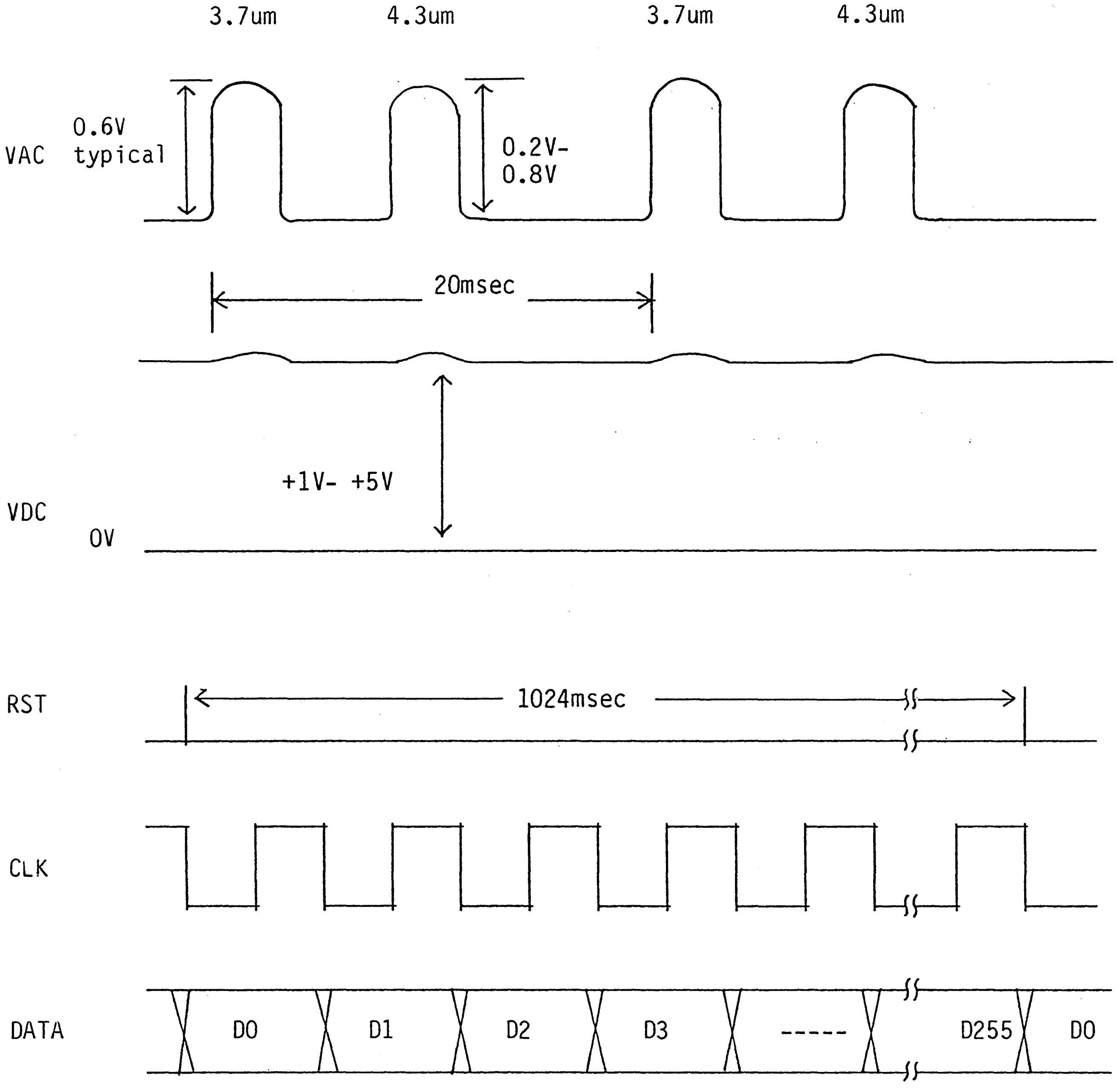
VH ...... +12V ± power voltage to drive (heat) the infrared ray lamp.

VM ...... +2.4V ±2% power voltage to drive the motor for chopper disk.

RST ..... ROM reset pulse, 1024msec interval.

CLK ..... 250Hz clock signal.

d) CO2 sensor input/output signal timing


3.7um
4.3um
3.7um
4.3um
VAC
0.6V typical
0.2V-0.8V
20msec
VDC
+1V- +5V
0V
RST
1024msec
CLK
DATA
D0
D1
D2
D3

D255
D0

VAC and DATA are asynchronous.

5.10 02 head amplifier AG-820PA

5.10.1 General

The AG-820PA is one of the head amplifiers of BSM-8000 series bedside monitors to measure fraction of inspired oxygen (Fi02) using an 02 sensor connected with a ventillator, etc.

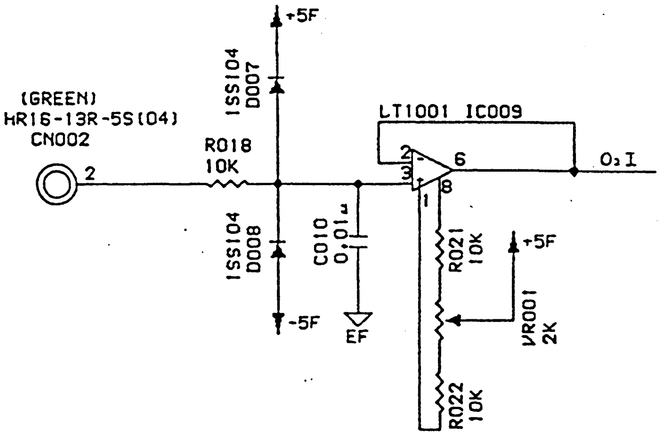
Diodes for over-voltage protection and high-cut filter for noise reduction are employed in the input circuit block.

. **Composition**

After filtering, signal is buffed with IC009 and IC010 and then multiplexed with IC007 multiplexer device. Multiplexer output signals are Ref0, 02I, and 02II. Multiplexing is controlled by clock signal generated by IC006 counter.

. **Input buffer**

There are two similar circuits of input buffer for 02I and 02II. Description below is for 02I.

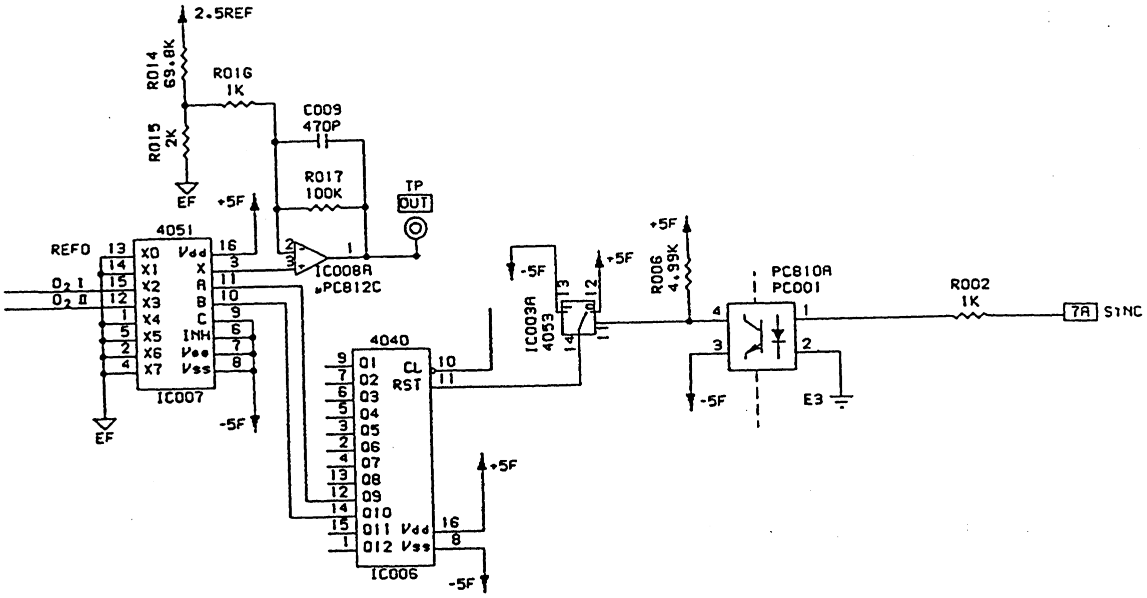

(GREEN)
HR16-13R-5S(04)
CN002
2
R018
10K
+5F
1SS104
D007
1SS104
D008
-5F
C010
0,01μ
EF
LT1001 IC009
2
3
6
8
1
O₂I
R021
10K
+5F
VR001
2K
R022
10K

Voltage generated by the 02 sensor in proportion to 02 density is inputted to the IC009 through the D007 and D008 protective diodes and low-pass filter composed of R018 and C010. This low impedance signal is outputted to the multiplexer.

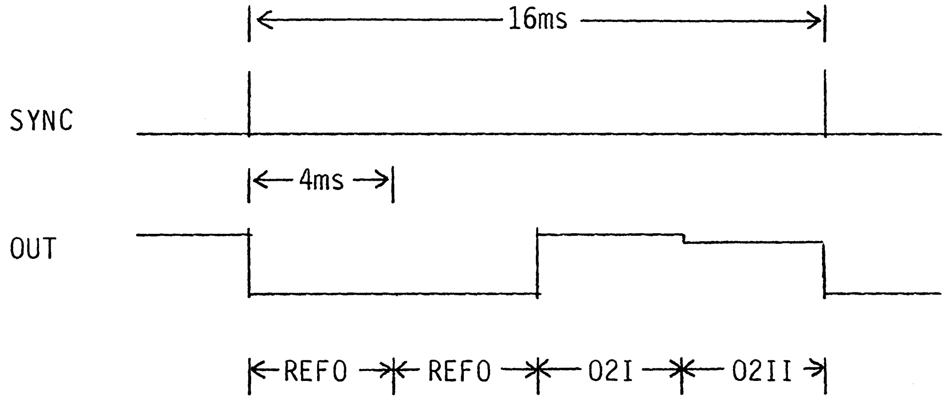
The VR001 is for offset adjustment of IC009 buffer amplifier. When the IC009 is replaced, VR001 adjustment is required.

. Output signal timing

Time-shared output signal is amplified and transmitted by a circuit shown below.


2.5REF
R014 69.8K
R016 1K
C009 470P
R015 2K
R017 100K
TP OUT
EF
+5F
4051
REFO
O2 I
O2 II
X0 X1 X2 X3 X4 X5 X6 X7
Vdd X A B C INH Vee Vss
IC007
-5F
IC008A
μPC812C
4040
Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12
CL
RST
Vdd
Vss
IC006
IC003A
4053
R006 4.99K
PC810A
PC001
R002
1K
7A
SYNC
E3

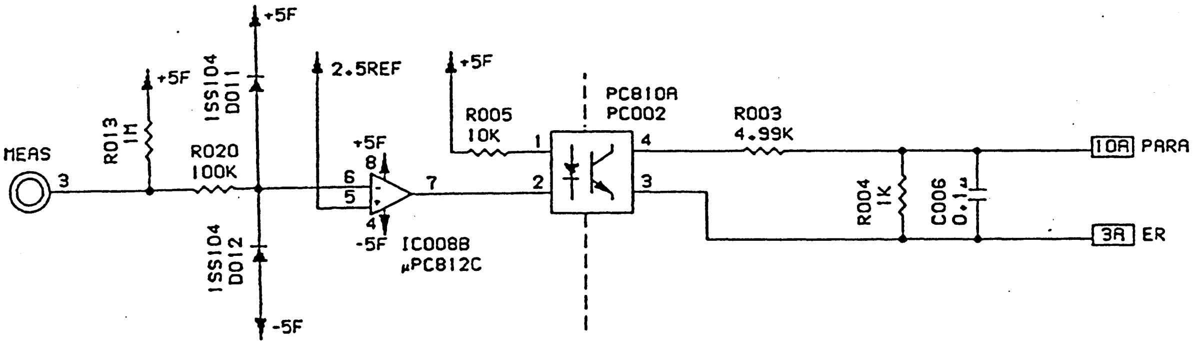
Multiplexer IC007 outputs Ref0, 02I and 02II signals in the timing below by the control signal from IC006 counter.


16ms
SYNC
4ms
OUT
REFO
REFO
02I
02II

Multiplexed output signal is 35 times amplified with IC008A and level shifted (output is -4.8 ±0.25V when input is shortened) an then transferred to a modulation circuit.

Refer to the pages for BP head amplifier output signal modulation and demodulation of descriptions for timing from floating area to the non-floating area.

. Unit discrimination signal (PARA voltage)


+5F
+5F
1SS104
D011
2.5REF
+5F
PC810A
PC002
R013
1M
MEAS
3
R020
100K
R005
10K
R003
4.99K
10A
PARA
+5F
8
6
5
7
1
2
4
3
R004
1K
C006
0.1
3A
ER
4
-5F
IC008B
μPC812C
1SS104
D012
-5F

PARA (parameter) voltage changes when the 02 sensor is connected and disconnected as below.

Sensor	PARA voltage (V)
Connection	0.45 ±0.02
Disconnection	0.40 ±0.02

When the sensor is not connected, IC008A comparator output is LOW level. With this voltage, the photocoupler PC002 is conductive and 0.4 ± 0.02V voltage attenuated with R003 and R004 resistors appears as PARA voltage at no sensor connection.

When the sensor is connected, comparator output is HI. With this voltage, PC002 becomes off and 0.45 ±0.02V appears as PARA voltage at sensor connection.

. Adjustment of the 02 head amplifier

When the IC009 (02I) or IC010 (02II) is replaced, offset adjustment is required.

IC009 (02I) VR001
IC010 (02II) VR002

1) Insert the 02 head amplifier into the last slot of the input box.
2) Call up the A/D Test Screen of the bedside monitor main unit.
3) Shorten the input connector pins 2, 3, and 5 to the pins 1 and 4 (EF: floating ground) and adjust each volume so that Test pins TS6 and TS8 becomes within ±10mV of REFO.

NOTE: TS2 value and TS4 value of #5 (02) lines in the table indicate REFO voltage, and TS6 value indicates 02I voltage and TS8 indicates 02II voltage.

Unit of the value is mV and upper numerals show maximum value and lower numerals show minimum value in one second.

AD TEST	TS1	TS2	TS3	**TS4**	TS5	**TS6**	TS7	**TS8**
CH#1 (ECG1)		5117 5117		5117 5117		5117 5117		5117 5117
CH#2 (ECG2)		-10 2		-10 2		-10 5		-10 5
CH#3 (RESP)		0 7		-2 7		0 10		-2 7
CH#4 ( )		5 12		5 12		7 12		-15 -10
CH#5 (02)		**-4870 -4865**		**-4870 -4865**		**-4875 -4870**		**-4872 -4865**
CH#6 ( )		2 10		2 7		2 10		2 10
CH#7 ( )	5 12	5 10	2 10	5 10	5 12	2 7	7 12	5 12
CH#8 ( )	5 10	5 10	7 10	5 10	5 12	5 10	5 12	2 10
CH#9 ( )	-17 -10	17 22	-12 -5	17 22	10 15	5 10	8 12	5 10
CH#10( )	2 7	2 7	2 10	2 7	5 10	2 7	5 10	2 10
CH#11(PARA)	97 102	5020 5025	457 462	5020 5025	5017 5022	5020 5025	5017 5022	5020 5025
CH#12( )	0 2	-5030 -5027	-2515 -2512	2 2	2512 2515	5027 5030	5020 5022	2 2
HEAD AMP INSTALLED	ECG		02					

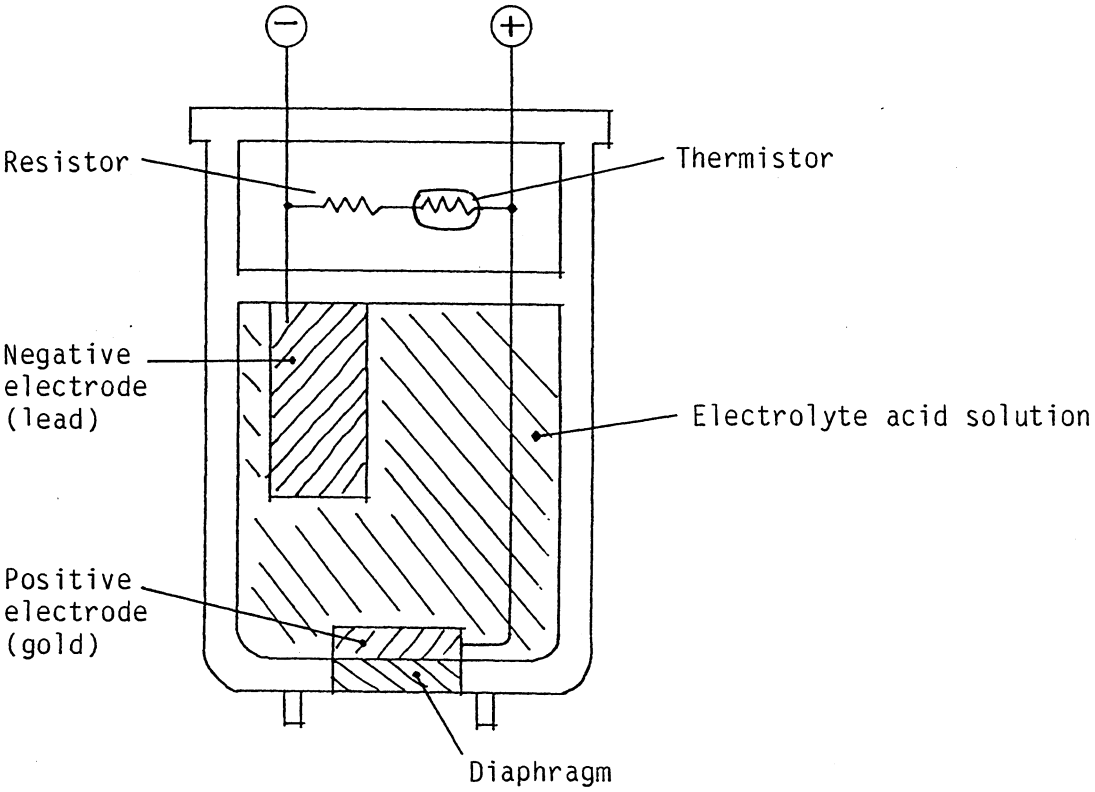
5.10.2 OS-1000 02 sensor (AIKA, Japan)

Measuring principle of 02 and construction of the 02 sensor

As figured, 02 sensor is an oxygen-lead battery composed of gold as positive electrode, lead as negative electrode and special electrolyte acid solution.

Oxygen in 02 measurement atmosphere diffuses to gold electrode through a non porous fluororesin diaphragm and deoxydated by electolysis and current which is proportional to oxygen dencity flows in the electrodes.

Voltage across a resistor and a thermitor for temperature compensation serially connected is obtained to measure oxygen density.


−
+
Resistor
Thermistor
Negative electrode (lead)
Electrolyte acid solution
Positive electrode (gold)
Diaphragm

Life time of the 02 sensor

the 02 sensor has a life time as it is an oxygen battery which generates voltage in response to oxygen in atmosphere. Life time depends upon oxygen density of measuring gas. The higher oxygen density, the shorter life time of the 02 sensor.

It is not sure to define life time of the 02 sensor as measurement will be done with various oxygen density.

End of life of the 02 sensor means that the sensor does not generate voltage which is high enough for 02 measurement.

Figure on the next page shows relation between oxygen density and output voltage of 02 sensor model OS-1000, a product of AIKA, Japan.

When O2 sensor is exposed in oxygen for a long time of period, slope of the output voltage curve becomes small.

Nihon Kohden O2 measurement is designed to define the end of life of the O2 sensor when output voltage corresponding to that of 100% oxygen shows less than 35mV.

When an exhausted sensor is used, measurement error goes out of specified normal range. When such condition is detected at calibration, message "INOP" (inoperative) is displayed on the screen and "CAL??" remains on the screen without measurement.

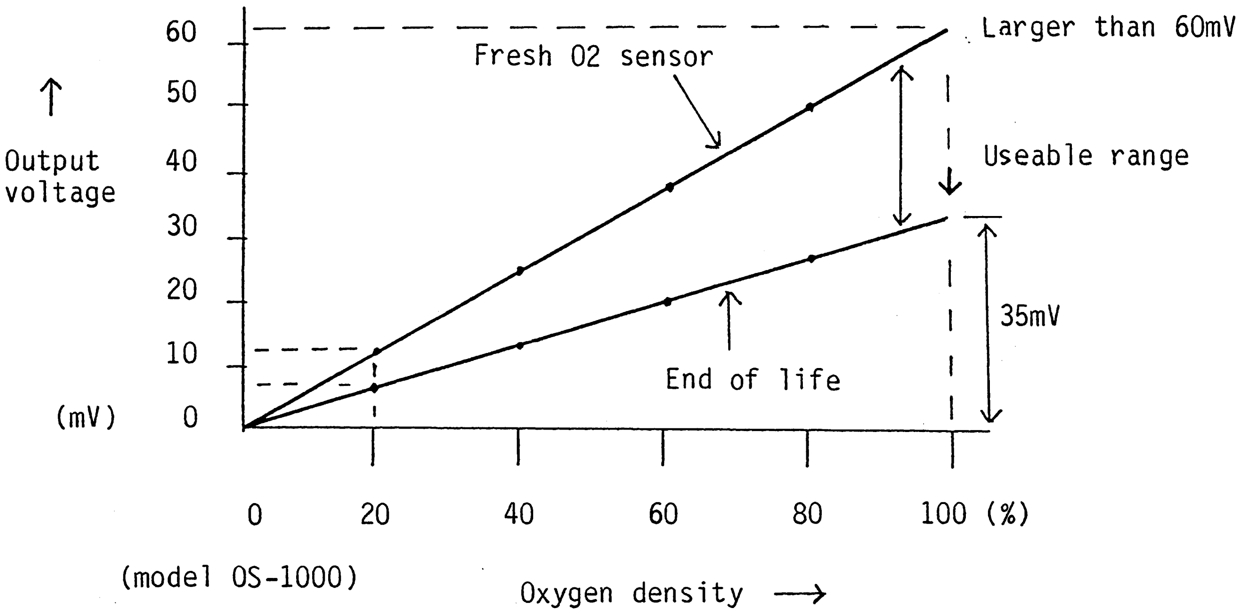
It is estimated that life time of the O2 sensor is three to five years.

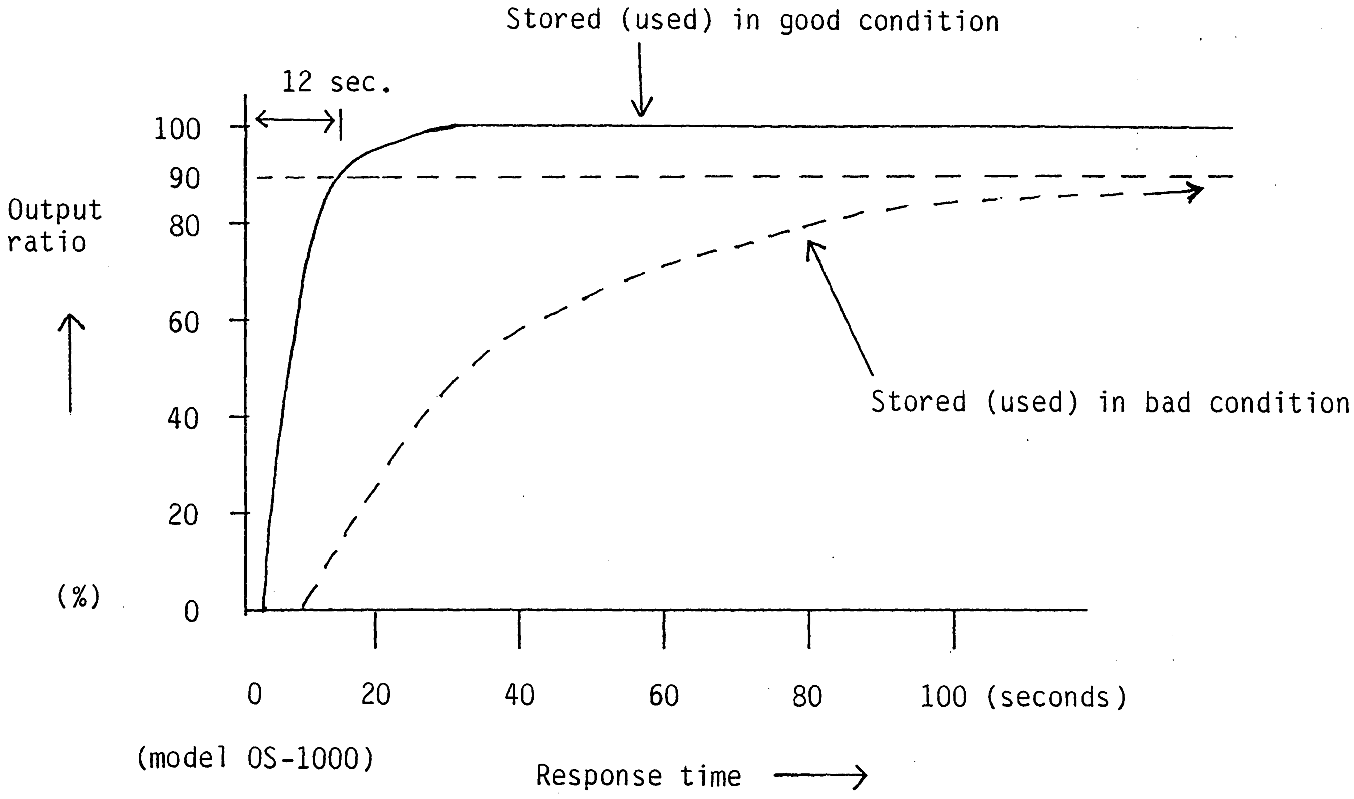
Precautions when handling the O2 sensor

In order to avoid influence by pressure change inside the sensor due to change of atmospheric pressure, gas is filled in the sensor chamber. Therefore, when sensing part is located upwards, gas bubble will be placed on the diaphragm or electrode which will prevent electrolysis inside the chamber and correct data cannot be obtained.

Be sure to put the sensor so that the sensing part is facing downwards for correct measurement. When storing the O2 sensor, it is recommended to put the sensing part downwards.

If the sensing part is kept upwards it takes several minutes for the sensor to become stabilized before calibration. Be sure to calibrate the sensor after several minutes.




Stored (used) in good condition
12 sec.
100
90
Output ratio
80
60
40
20
(%)
0
Stored (used) in bad condition
0
20
40
60
80
100 (seconds)
(model OS-1000)
Response time

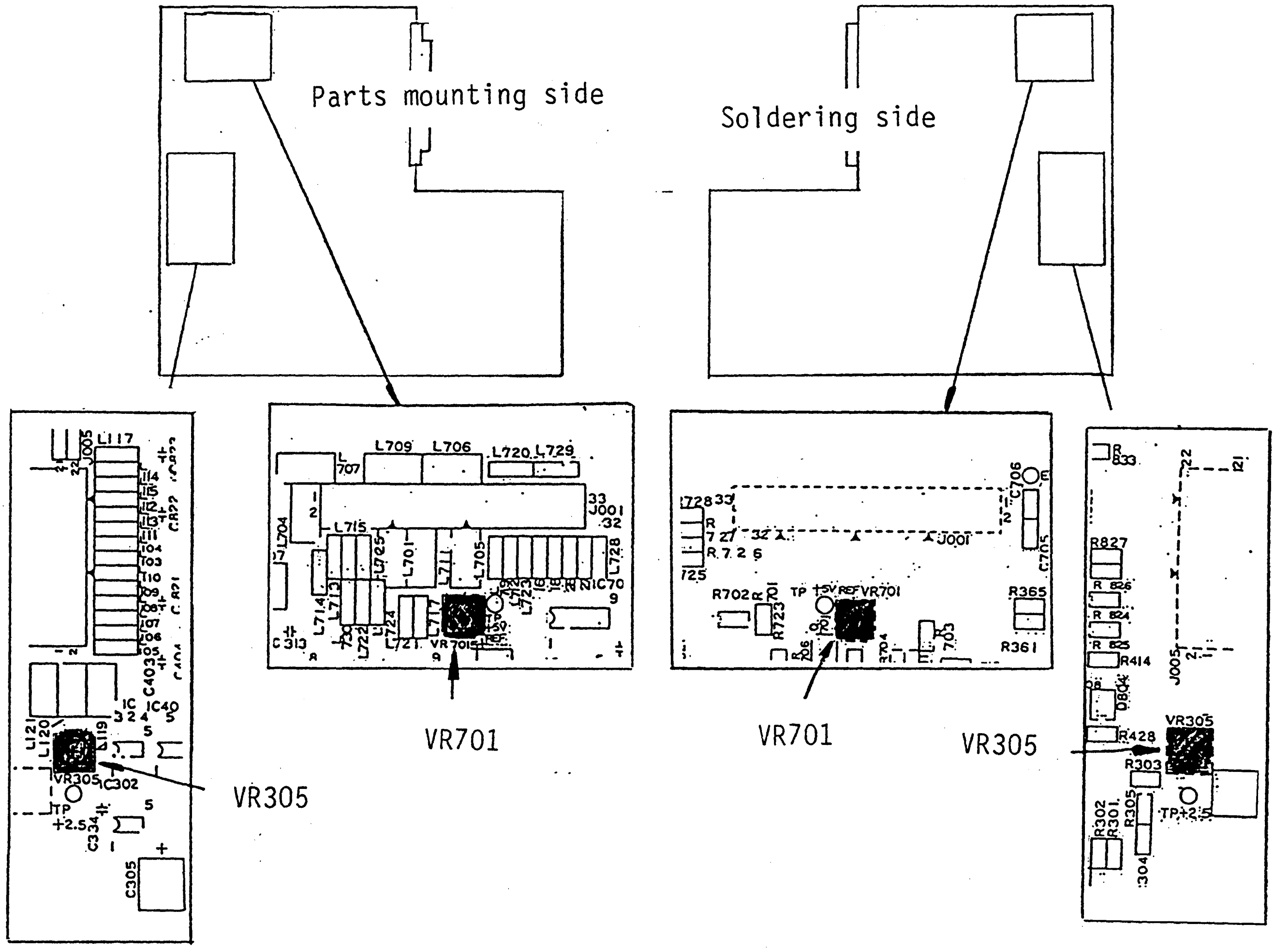
Section 6

6. Adjustment

6.1 Main board (UP-0397)

1) Reference voltage
Reference voltage is used for testing conversion sensitivity of A/D converter and for PARA voltage for head amplifier discrimination.

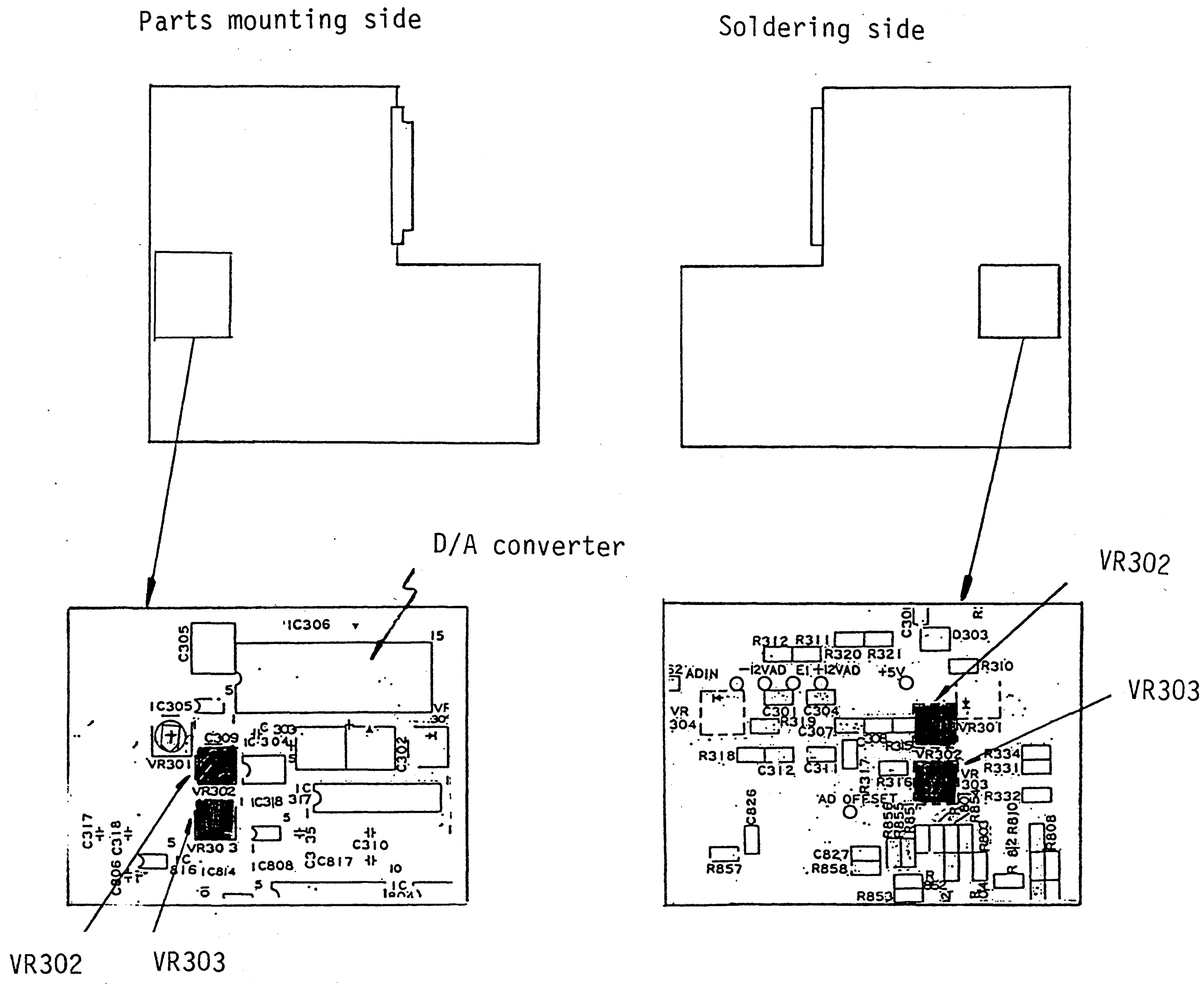
- Adjust VR305 so that Test Point reads 2.500V ±0.001V
- Adjust VR701 so that Test Point reads 5.000V ±0.001V


Parts mounting side
Soldering side
VR305
VR701
VR701
VR305
L117
J005
L120
L121
L119
C302
C334
C305
TP
+2.54
L709
L706
L720
L729
L707
J001
L704
L715
L701
L705
L728
C313
VR701
R702
R723
TP +5V REF VR701
R365
R361
C706
C705
R827
R826
R824
R825
R414
J005
R428
VR305
R303
R302
R301
R305
TP+2.5

2) D/A converter

Adjustment of D/A conversion sensitivity and offset voltage.

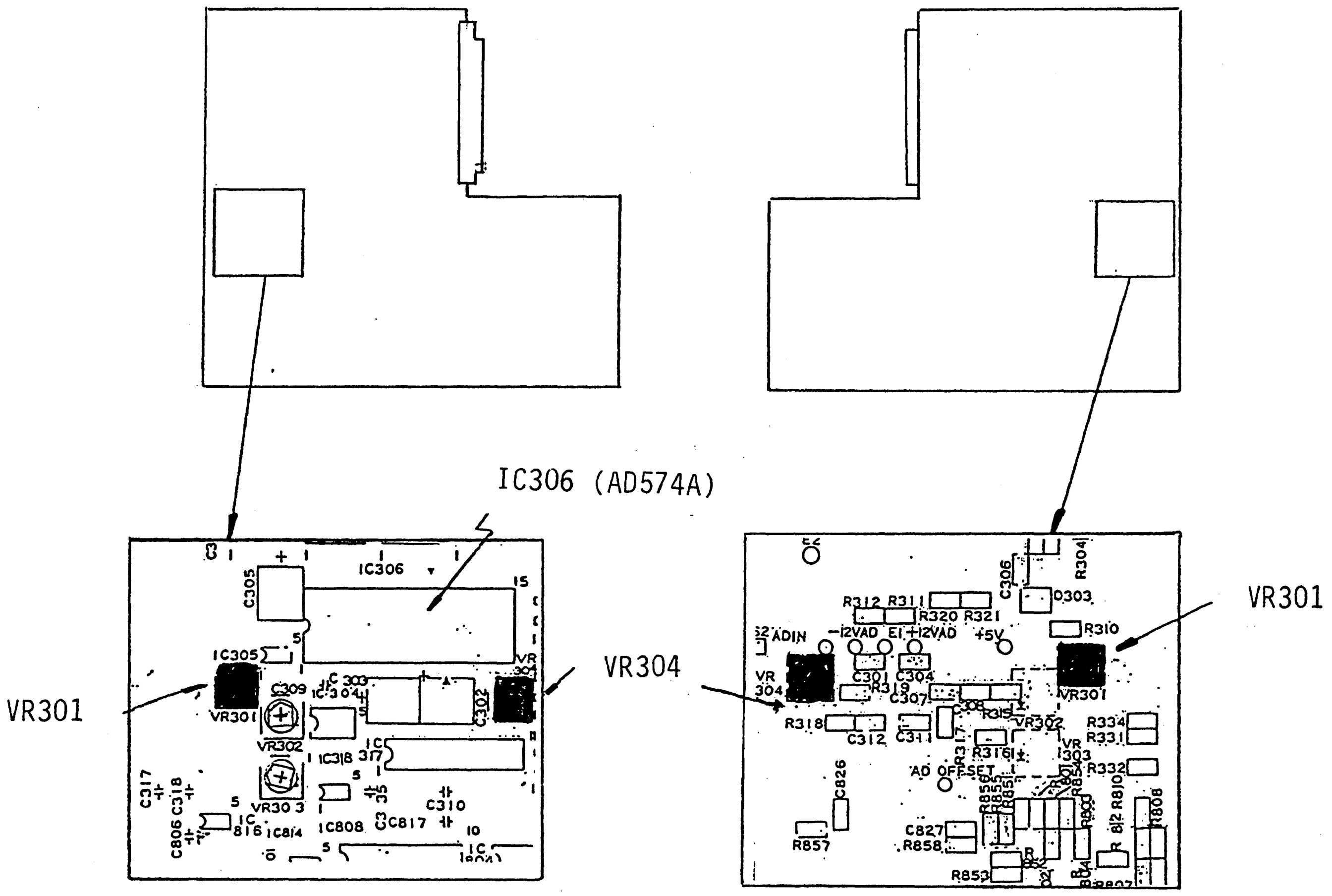
- Call up Self Test screen No.1 and select A/D, D/A TEST mode (by pressing DISPLAY key) and then select D/A TEST mode.
- Adjust VR302 so that BP1 output on the front panel reads -5.118V ±0.01V at D/A 000.
- Adjust VR303 so that BP1 output on the front panel reads +5.120V ±0.01V at D/A FFF.
- Repeat above two adjustment procedures. (D/A 000 and FFF can be changed by pressing the FREEZE key on the front of the bedside monitor.)


Parts mounting side
Soldering side
D/A converter
IC306
IC305
VR301
VR302
VR303
VR302
VR303
VR302
VR303
VR301
AD OFFSET
R857
R858
R853

3) A/D converter

Adjustment of A/D conversion sensitivity and offset voltage.

- After D/A converter adjustment, select Self Test No.1 A/D, D/A TEST. Select TEST item 2 (SELECT) (by pressing the SUSPEND key).
- Adjust VR304 so that A/D GAIN reads 7D0.
- Adjust VR301 so that A/D ADJ 0V read 800.
- Adjust VR302 and and VR303 so that D/A ADJ 0V and GAIN read 800 and 7D0.


Parts mounting side

Soldering side

IC306 (AD574A)
VR301
VR304
VR301
IC306
C305
IC305
VR301
VR302
VR303
C309
C302
IC318
C310
IC808
C817
VR 304
R318
C301
C304
C307
C312
C311
R310
R311
R312
R320
R321
D303
C306
R304
ADIN
-12VAD
+12VAD
+5V
R316
R317
R315
VR302
VR303
R331
R332
R334
AD OFFSET
C826
R857
C827
R858
R853
R810
R808

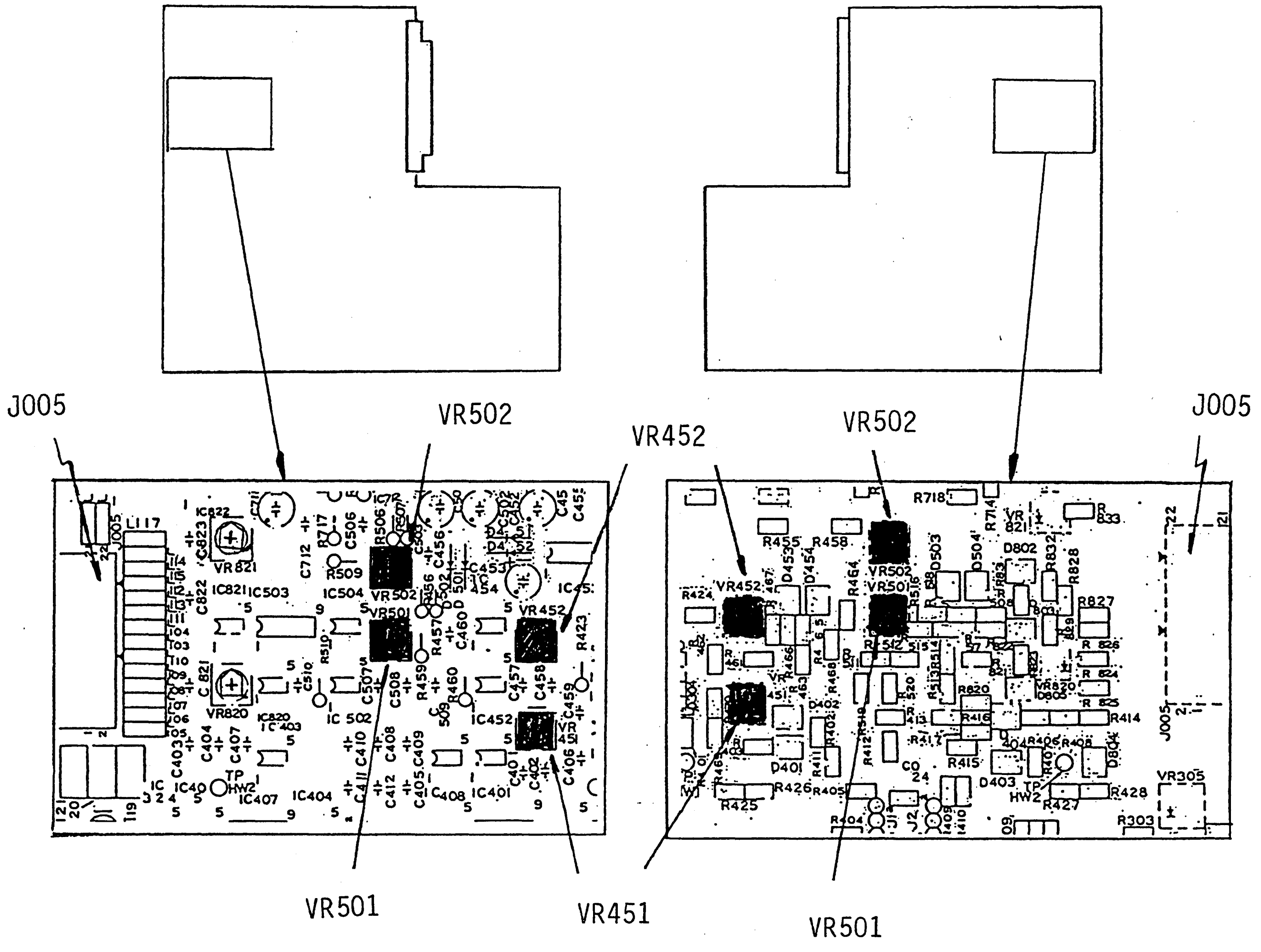
4) ECG circuit

Adjustment of ECG circuit offset voltage and hum filter characteristics

- Shorten all ECG input terminals.
- Adjust VR452 and VR502 so that both Test Points HW1 and HW2 read 0V ±0.01V.
- Apply 54Hz 6mVp-p sinewave between ECG leads L and F (or LA and LL) and select ECG lead II at 3 wire mode and set HUM FILTER to ON.
- Adjust VR451 and VR501 so that both Test Pins HW1 and HW2 become minimum.

Parts mounting side

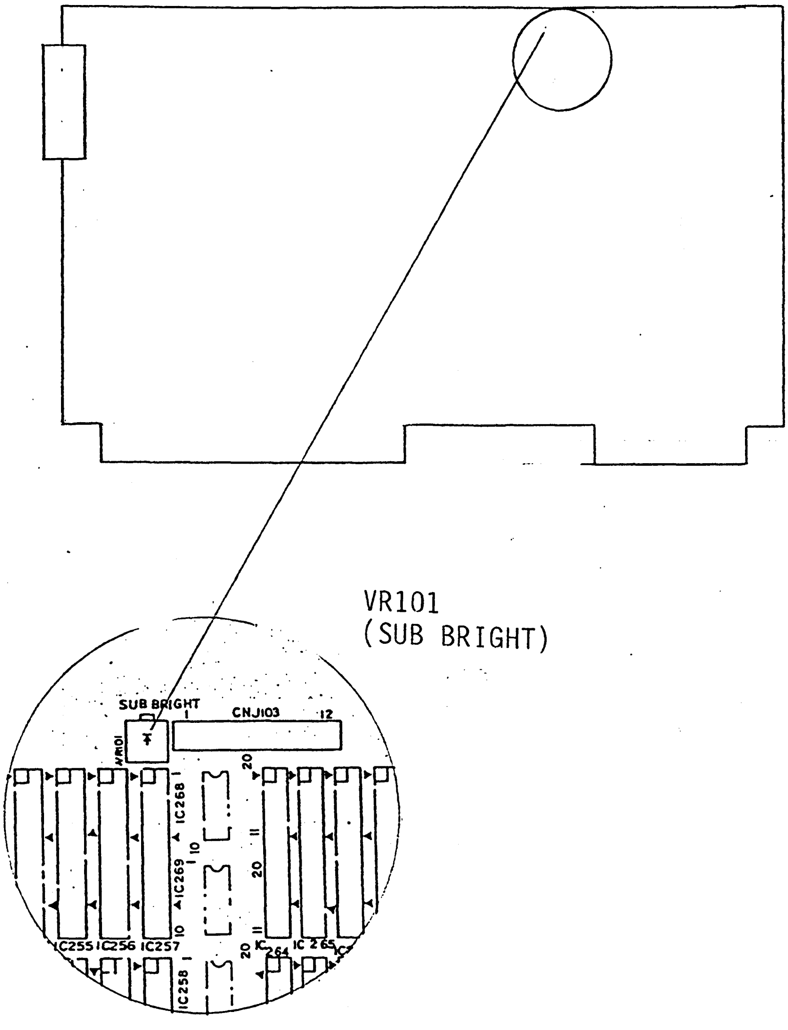
Soldering side



6.2 CRTC board (UP-0398)

There is only one adjustment point on the CRTC board.

. If screen is dark and not bright enough even if screen surface is cleaned, adjust VR101 SUB-BRIGHT volume. If this adjustment cannot make the screen bright enough, CRT board must be adjusted as below.


VR101
(SUB BRIGHT)
SUB BRIGHT
CNJ103
1
12
VR101
IC268
IC269
IC255
IC256
IC257
IC258
IC264
IC265
20
10
11

6.3 CRT unit (VM-004P)

CRT unit has adjustment points of screen synchronization, brightness, screen size, position, linearity (distortion) and focusing. Call up Self Test Screen No.2.

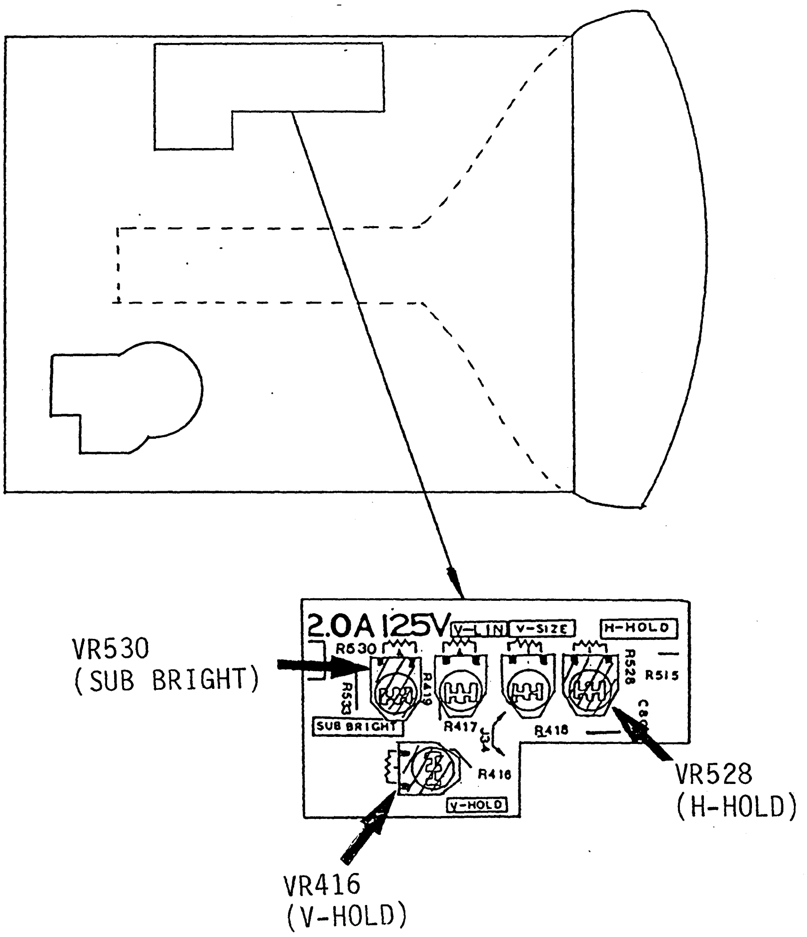
1) Horizontal and vertical synchronization

- Find out volume positions by rotating the VR528 (H-HOLD) clockwise and counterclockwise where screen becomes out of synchronization horizontally.
- Set volume position at the center of two points. If screen does not become out of synchronization even if the volume is fully rotated, assume the position to be the position.
- Adjust the VR416 (V-HOLD) for the vertical synchronization in the same manner as for H-HOLD.

2) Screen brightness

If screen is dark and not bright enough even if screen surface is cleaned and CRTC board SUB-BRIGHT is adjusted, adjust the CRT unit brightness. When this adjustment is required, the screen is becoming end of life. Prepare a new CRT unit for the bedside monitor.

- Adjust VR530 (SUB-BRIGHT) so bright up the screen. If you have an illumination meter, adjust to 240cd/m^2 ± 20cd/m^2 at Self Test All Raster mode screen.


2.0A 125V
V-LIN
V-SIZE
H-HOLD
R530
R419
R528
R515
R533
SUB BRIGHT
R417
R418
R416
V-HOLD
VR530
(SUB BRIGHT)
VR528
(H-HOLD)
VR416
(V-HOLD)

3) Screen size

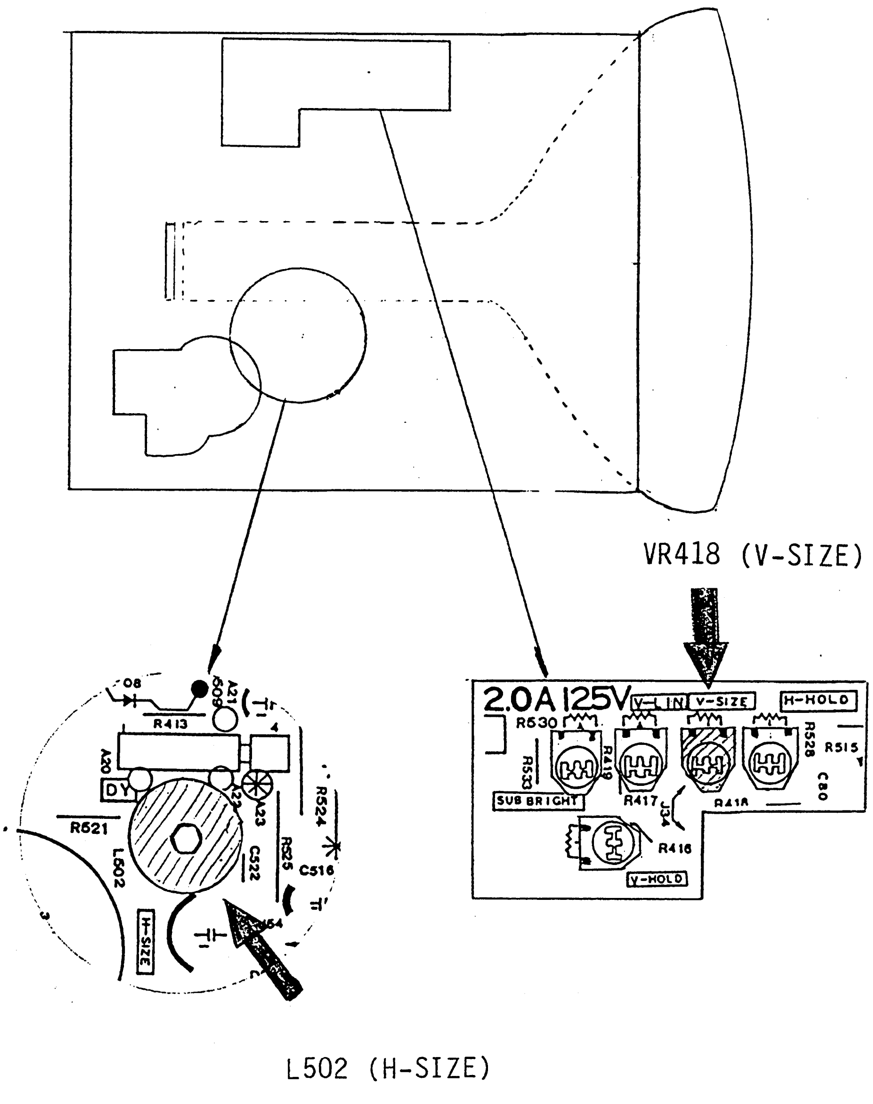
Adjustment of vertical and horizontal length. Call up Self Test Grid screen.

. Adjust VR418 (V-SIZE) so that vertical size becomes 120mm ±4mm.

. Adjust L502 (H-SIZE) so that horizontal size becomes 160mm ±4mm.

Be sure to use a ferrite core screw driver for the L502 otherwise the core can be broken.

Material: Non-magnetic


2.0A 125V
V-LIN
V-SIZE
H-HOLD
R530
R533
R419
R528
R515
C80
SUB BRIGHT
R417
J34
R418
R416
V-HOLD
R413
A21
R509
A20
DY
A22
A23
R524
R521
L502
C522
R525
C516
H-SIZE

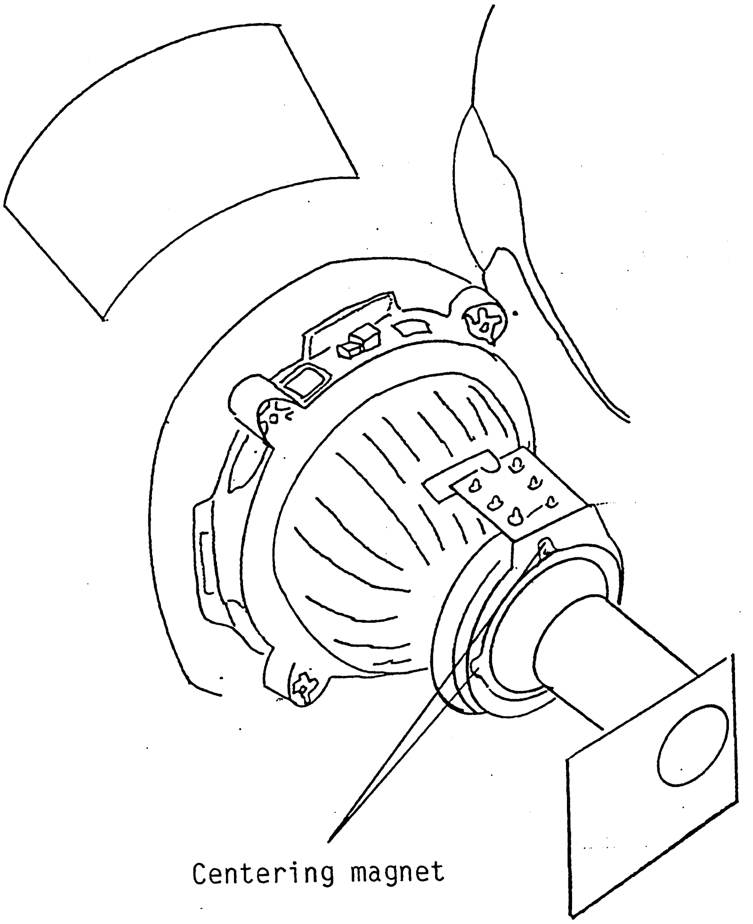
VR418 (V-SIZE)

L502 (H-SIZE)

4) Screen position

Adjustment of raster position.

. Rotate magnetic rings around the CRT neck so that display area becomes at the center of the screen.


Centering magnet

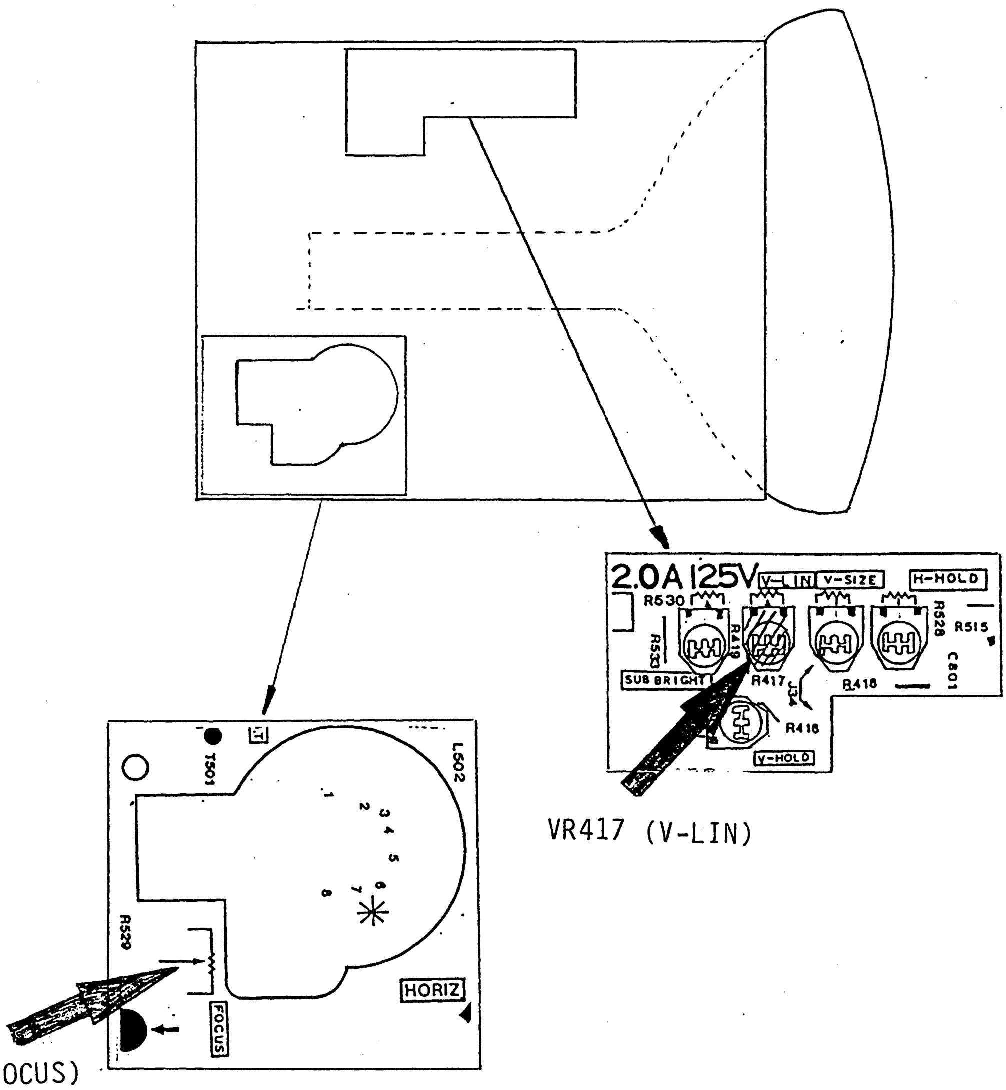
5) Screen linearity (distortion)

Adjustment of screen distortion.

- Adjust VR417 (V-LIN) so that grid spaces become equal vertically.

6) Focusing

- Adjust VR529 (FOCUS) so that entire screen focus is equal.


2.0A 125V
V-LIN
V-SIZE
H-HOLD
R630
R419
R533
R528
R515
C801
SUB BRIGHT
R417
J34
R418
R416
V-HOLD
T501
L502
R529
FOCUS
HORIZ
1
2
3
4
5
6
7
8

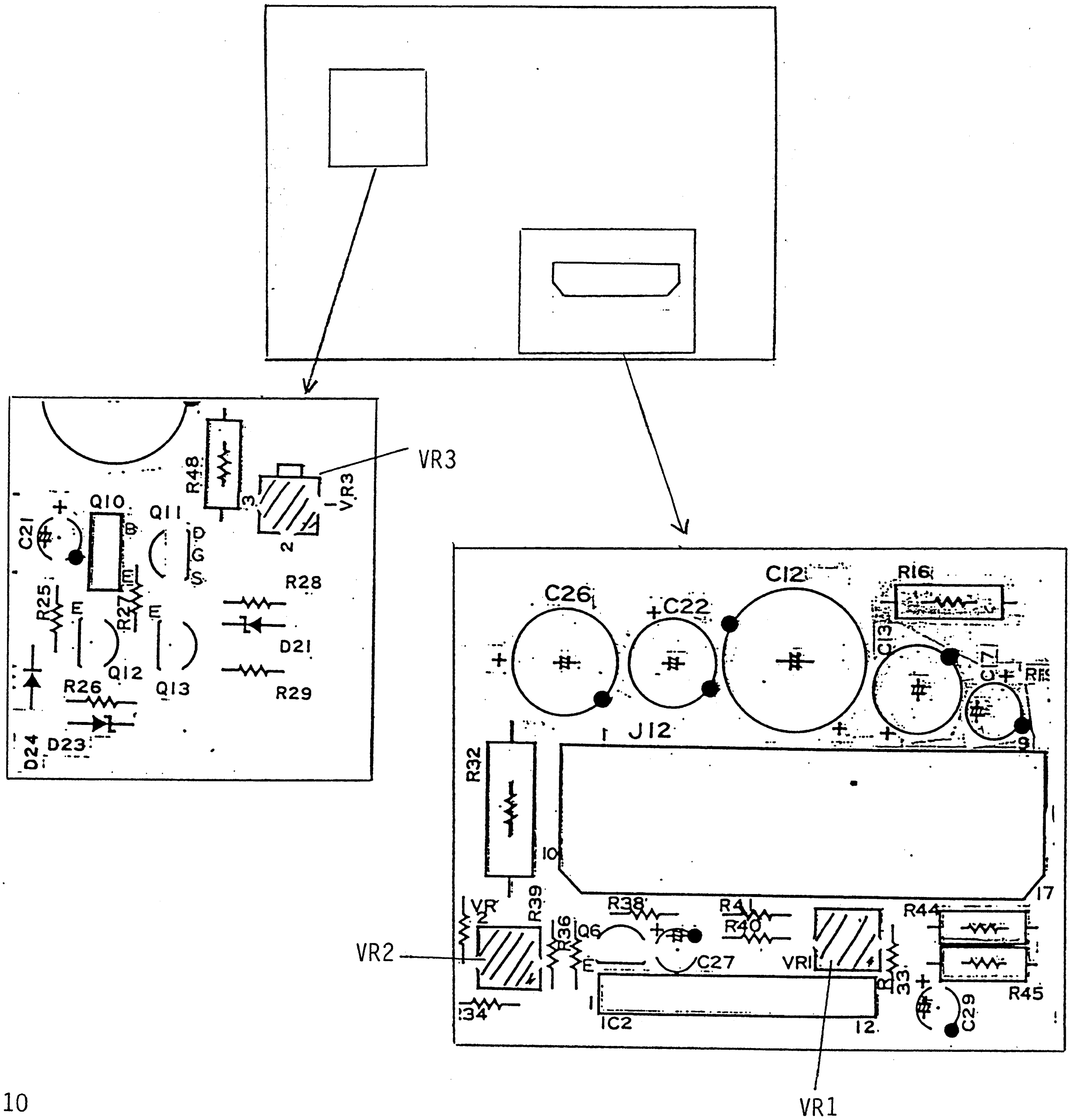
VR417 (V-LIN)

VR529 (FOCUS)

6.4 Power supply adjustment

Adjustment of voltage and current limitter. Adjustment is done with loaded +5V current flow, adjustment must be done with a 1.7ohm, 20W resistance load (Io = 3A) to +5V when adjusting.

- Adjust VR1 so that voltage across pin-13, 12 and pin-4, 3 (last end of connector) reads +5.0V ±0.05V.
- Adjust VR3 so that voltage across pin-11, 10 and pin-2, 1 (last end of connector) reads +12.0V ±0.1V.
- Adjust VR2 so that current limitter of +5V line functions at 3.2A current flow. (Connect a 20ohm, 2W resister in parallel of the 1.7ohm resistanve load. Adjust VR2 so that +5V voltage drops to 4 to 3 volts.


VR3
R48
3
2
VR3
Q10
Q11
C21
B
D
G
S
E
R25
R27
E
R28
D21
Q12
Q13
R26
R29
D24
D23
C26
C22
C12
R16
C13
C17
J12
R32
10
17
9
VR 2
R39
R36
Q6
E
R38
R41
R40
C27
VRI
R44
R45
R33
C29
IC2
1
12
34
VR2
VR1

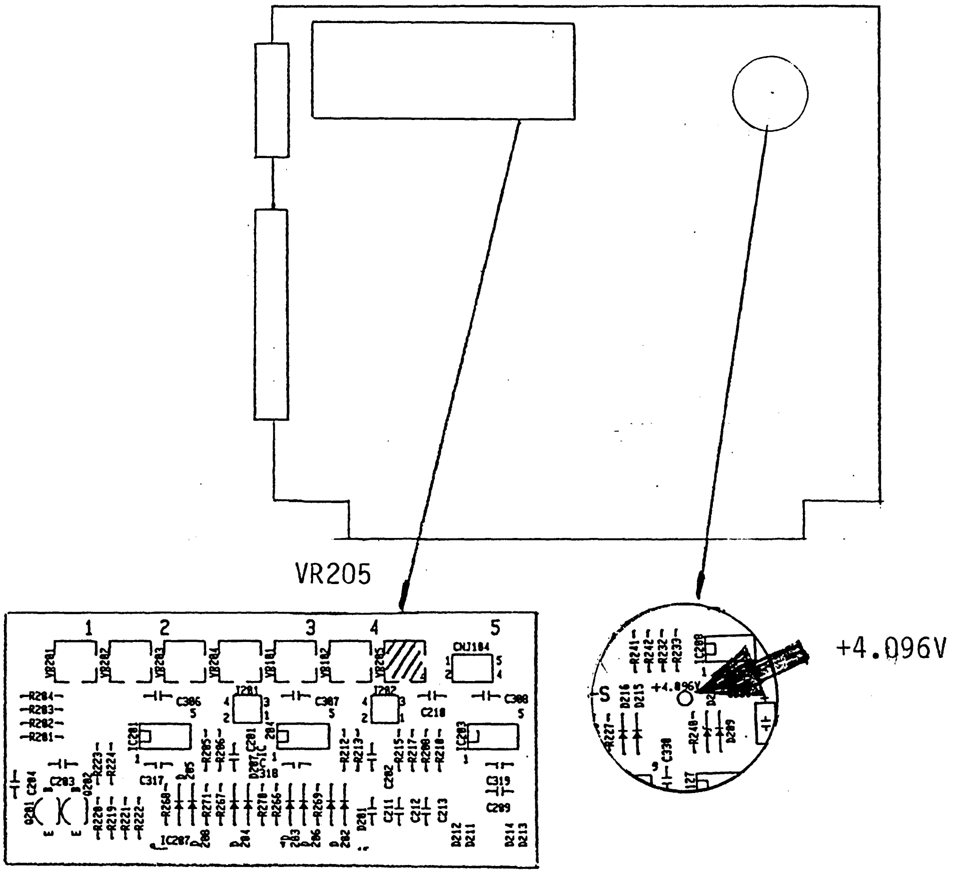
6.5 Central interface unit adjustment

Adjustment of D/A converter for waveform output to the central monitor and sensitivity and offset voltage for externally inputted voltage.

1) Reference voltage

Adjustment of reference voltage for A/D, D/A conversions.

- Adjust VR205 so that voltage across the Test Point 4.096V and E1 reads 4.096V ±0.001V.



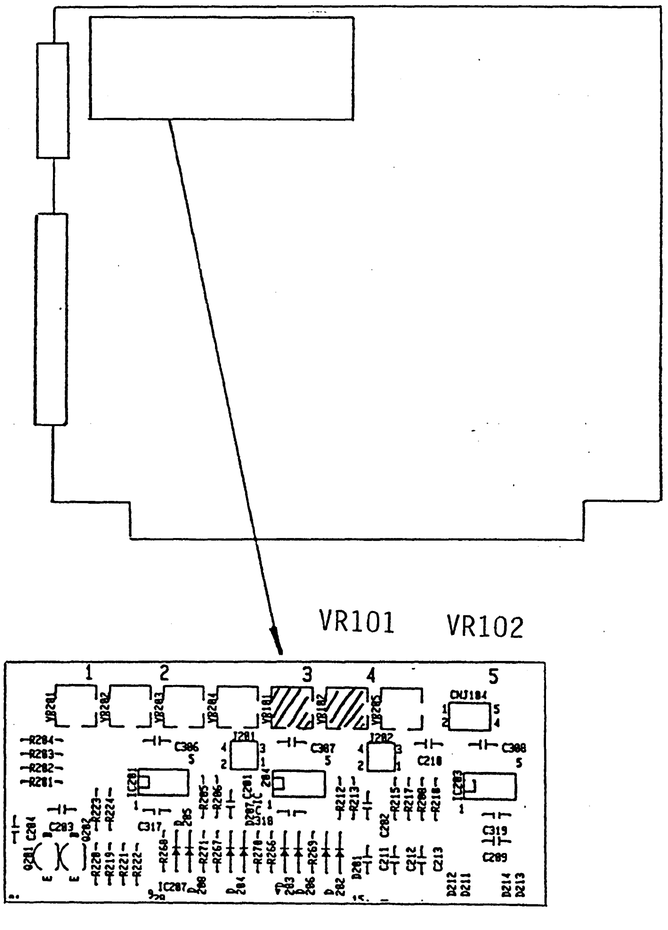
2) D/A conversion related

Adjustment of D/A converter for waveform output to the central monitor. Call up Self Test screen No.1 and select A/D, D/A TEST (by pressing the DISPLAY key) and then select D/A TEST (by pressing the RECORD key).

- Adjust VR101 so that CNS output BP1W terminal (voltage across pin-30 and pin-33, 34) reads +5.120V ±0.01V at D/A FFF.

- Adjust VR102 so that CNS output BP1W terminal (voltage across pin-30 and pin-33, 34) reads -5.118V ±0.01V at D/A 000.

- Repeat above adjustment procedures. (D/A FFF and D/A 000 can be selected by pressing the FREEZE key on the front of the bedside monitor).

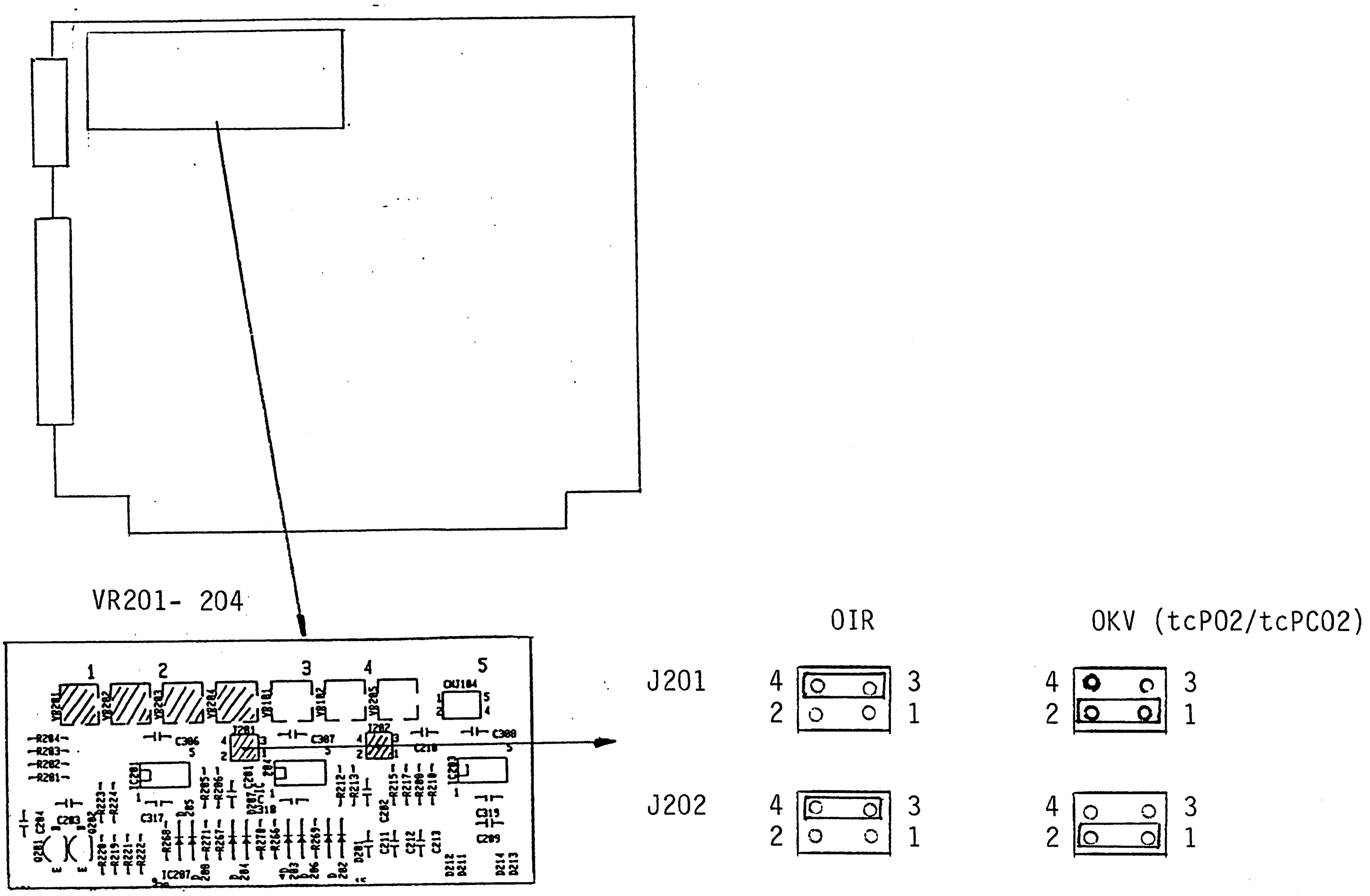

VR101
VR102
1
2
3
4
5
VR201
VR202
VR203
VR204
VR101
VR102
VR205
CNJ104
R204
R203
R202
R201
C306
C307
C308
C210
IC201
IC203
C317
C318
C319
C209
C203
C204
Q201
Q202
R223
R224
R220
R219
R221
R222
R268
R271
R267
R270
R266
R269
R205
R206
R212
R213
R215
R217
R208
R218
IC207
D201
C202
C211
C212
C213
D212
D211
D214
D213

3) Sensitivity and offset for externally inputted signals

Adjustment of sensitivity and offset voltage for externally inputted signals. Be sure that sensitivity differs according the instrument which is connected to the bedside monitor to the AUX connector. Sensitivity change is done with a short pin.

When adjusting, set the short pin to "1-2" which provides higher sensitivity. When external instrument is OIR, move the short pin to "3-4" after adjustment. Call up the Self Test screen No.1 and select item 6 (SELECT) by pressing the FREEZE key on the front of the bedside monitor.

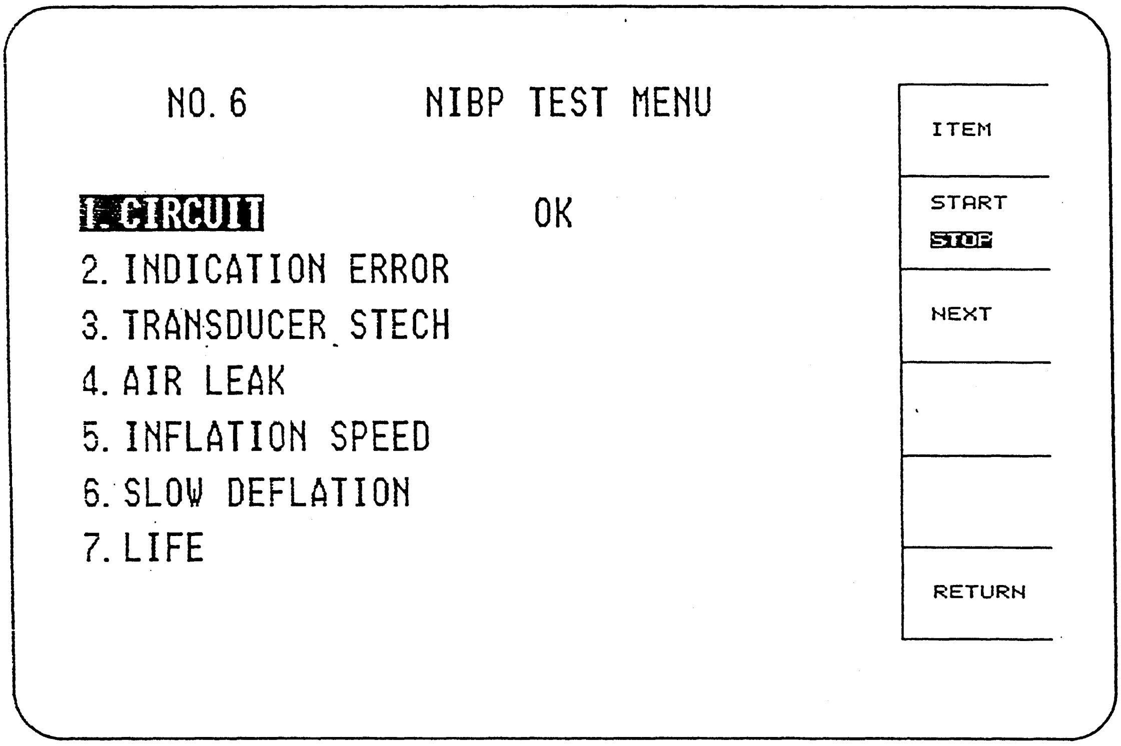
- Shorten the AUX1IN (pin-1), AUX2IN (pin-2) and AGND (pin-3) and adjust VR201 so that CHANNEL 2 reads 0, and adjust VR203 so that CHANNEL 3 reads 0V. There is no minus data indication. Stop at just 0V position.
- Apply +1.0V to AUX1IN and AUX2IN across AGND and adjust VR202 so that CHANNEL 2 reads 3E8 and adjust VR204 so that CHANNEL 3 reads 3E8.



6.6 NIBP adjustment

<Preparation>

- Call up Self Test screen No.6 and select NIBP Test. Refer to page 2-28 for details.
- Connect a dummy cuff chamber (800cc) to the cuff hose connector.



NO. 6 NIBP TEST MENU

1. CIRCUIT OK
2. INDICATION ERROR
3. TRANSDUCER STECH
4. AIR LEAK
5. INFLATION SPEED
6. SLOW DEFLATION
7. LIFE

1) AIR LEAK

This item is to test air leakage inside the NIBP unit and air system. 280mmHg cuff pressure is kept for three minutes to check pressure drop due to air leakage.

Connect a dummy cuff chamber (800cc) to the cuff hose connector.

Press the ALARM SUSPEND key to select item 4. AIR LEAK. Press the FREEZE key. Pressure motor starts running and cuff pressure is indicated on the center top of the screen. Wait for three minutes. Test results are indicated as below.

4. AIR LEAK *** *.*

Cuff pressure drop (mmHg) after three minutes

Cuff pressure (mmHg) after three minutes

Pressure drop must be less than 4.5mmHg in this test.

If pressure drop is larger than 5mmHg, check air system or replace the NIBP unit.

2) INFLATION SPEED

This item is to check cuff inflation speed.

Connect the dummy cuff chamber (800cc) to the cuff hose connector.

Press the ALARM SUSPEND key to select item 5. INFLATION SPEED. Press the FREEZE key. Pressure motor starts running and cuff pressure is indicated on the center top of the screen. Test results are indicated as below.

5. INFLATION SPEED *.* *.*

Time to reach 250mmHg (seconds)

Time to reach 150mmHg (seconds)

Time to reach 250mmHg must be 2.8 to 7.0 seconds.

3) SLOW DEFLATION

This item is to test slow cuff deflation speed with with a valve for air bleeding.

Connect a dummy cuff chamber (800cc) to the cuff hose connector.

Press the ALARM SUSPEND key to select item 6. SLOW DEFLATION. Press the FREEZE key. Pressure motor starts running. Cuff pressure is indicated on the center top of the screen. It takes approximately two munutes to complete this test. Test results are indicated as below.

6. SLOW DEFLATION *.* *.* *.* *.*

Deftation speed at 40mmHg (mmHg/sec)

Deflation speed at 80mmHg (mmHg/sec)

Deflation speed at 160mmHg (mmHg/sec)

Deflation speed at 240mmHg (mmHg)

Each speed must be as below.

40mmHg ...... 2.6- 4.4mmHg/sec.
80mmHg ...... 4.6- 6.2mmHg/sec.
160mmHg ..... 4.6- 6.2mmHg/sec.
240mmHg ..... 4.6- 6.2mmHg/sec.

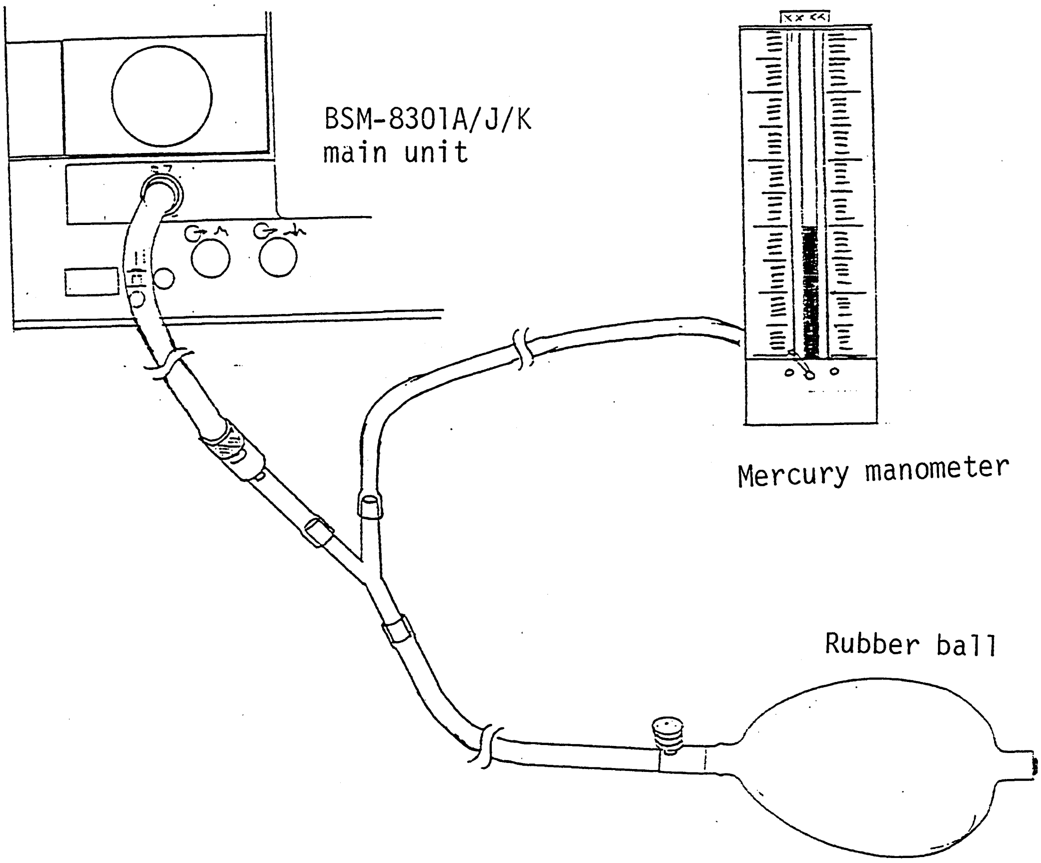
5) INDICATION ERROR

When above items 1) to 3) have passed, check pressure sensor accuracy by using mercury manometer.

Connect a dummy cuff chamber (800cc) to the cuff hose connector.

Press the ALARM SUSPEND key to select item 2. INICATION ERROR. Press the FREEZE key. Pressure motor starts running and stops at approximately 180mmHg. Cuff pressure is indicated on the center top of the screen.

Remove the dummy cuff chamber and connect the mercury manometer and rubber ball as illustrated.



Increse pressure with the rubber ball and compare pressure readings of mercury manometer and on the screen. Reads three points of 50, 150, and 250mmHg during inflation and deflation.

Difference between the two readings must be less than ±4.5mmHg.

NOTE: Items 3. TRANSDUCER STRECH and 7. LIFE are factory use only. There is no need to used the items in the field.

Section 7

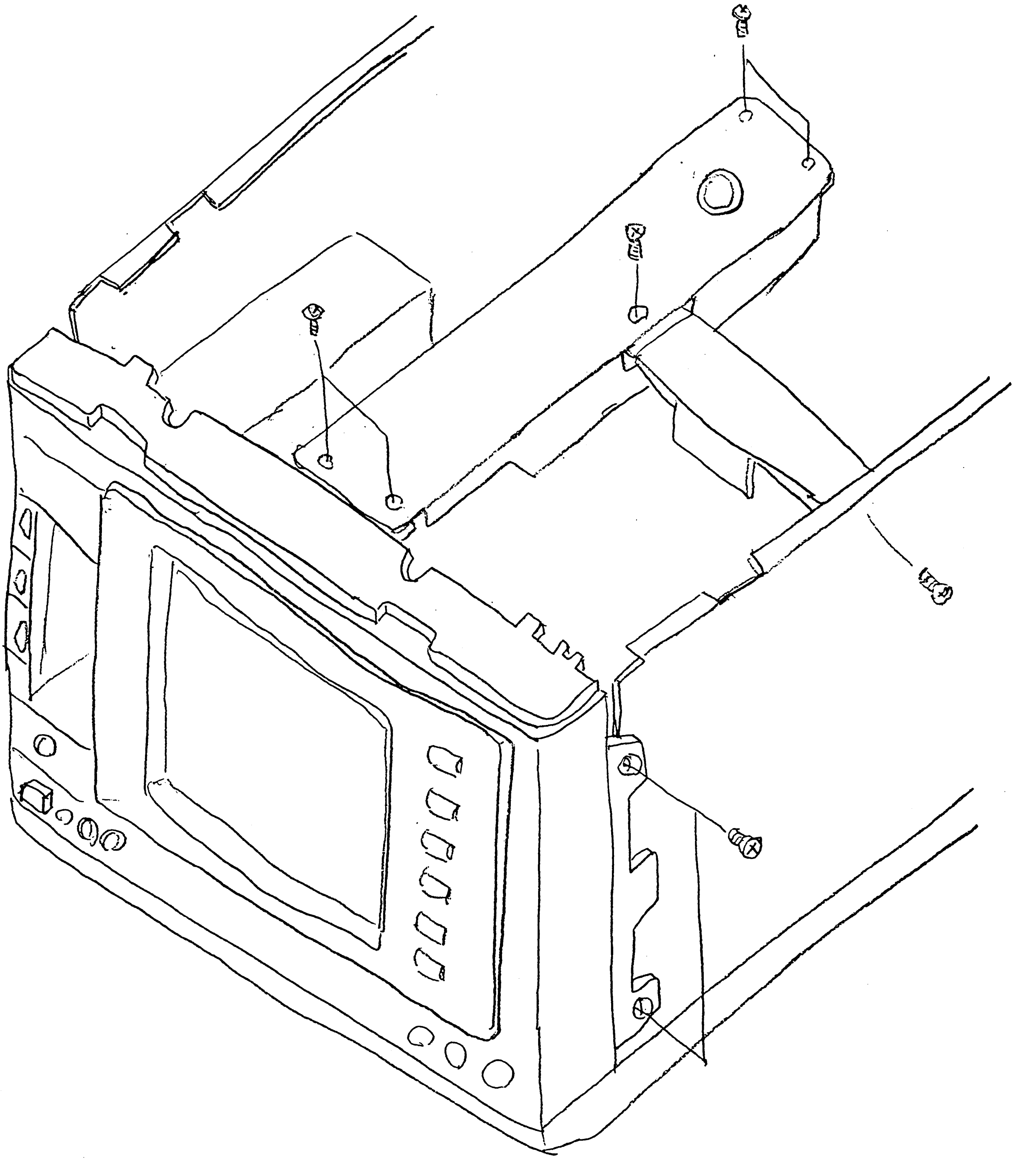
7. Disassembly and assembly

7.1 Front frame

1) Remove four screws fixing front panel, four screws fixing speaker holder, and two screws fixing PC board holder.

2) Remove the front frame by pulling out it forward you.

3) Remove the cable connector between the head amplifier mother board and main board, and between the operation board and main board.

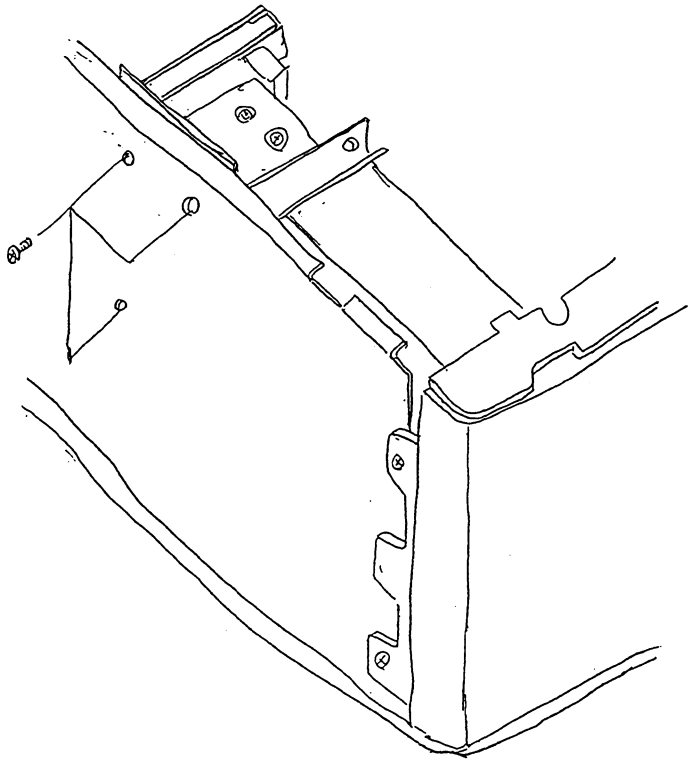


7.2 NIBP unit

1) Before disassembling the NIBO unit, remove the front panel and speaker holder as describe in page 7-2.

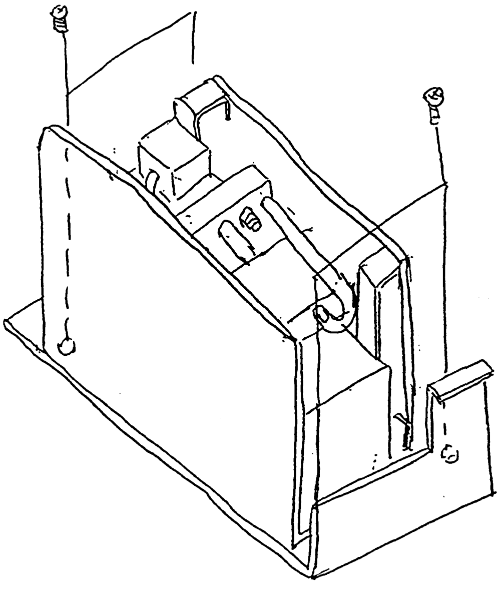
2) Remove three screws fixing the NIBP unit from the left side chassis.

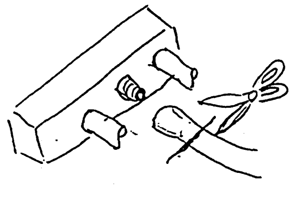
3) Remove the tube and cable connector.



4) Remove the four screws fixing the NIBP unit on the holder.

5) Cut the tuve a small amount before re-attaching the tube to the NIBP unit.



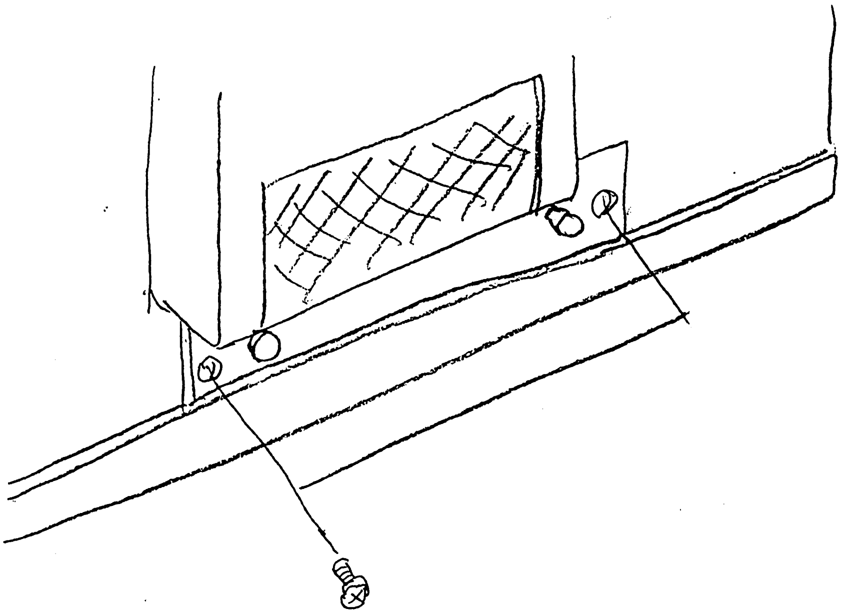


Cut the tube end
before re-attaching.

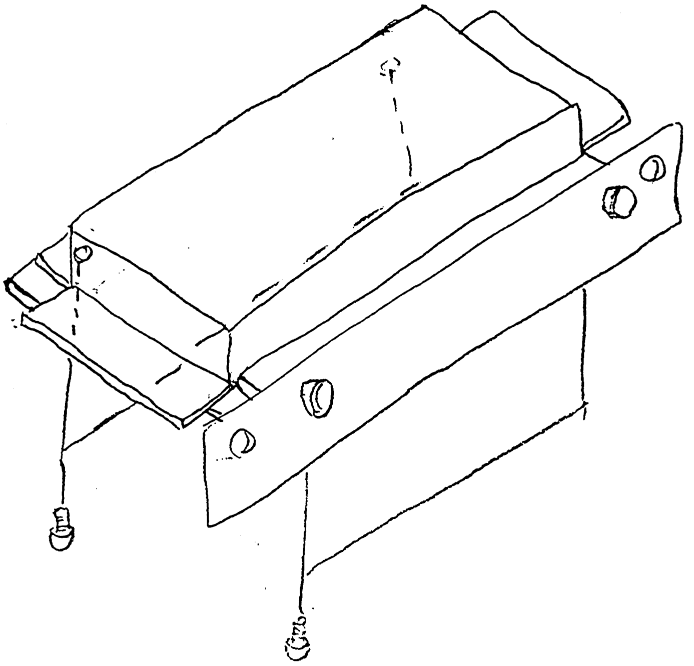
7.3 ROM pack

1) Remove the two screws fixing the ROM pack.

2) Take out the ROM pack by pulling out the two knobs on the ROM pack.



3) Remove the four screws fixing the metal shield case.



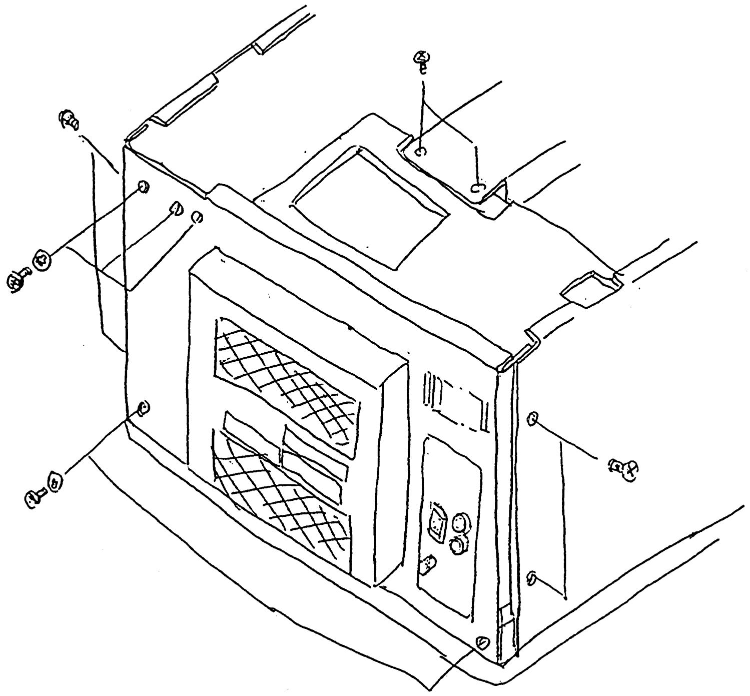
7.4 Power unit

1) Remove the two screws fixing the speaker holder, three screws fixing the PC board, and six screws fixing the rear chassis.

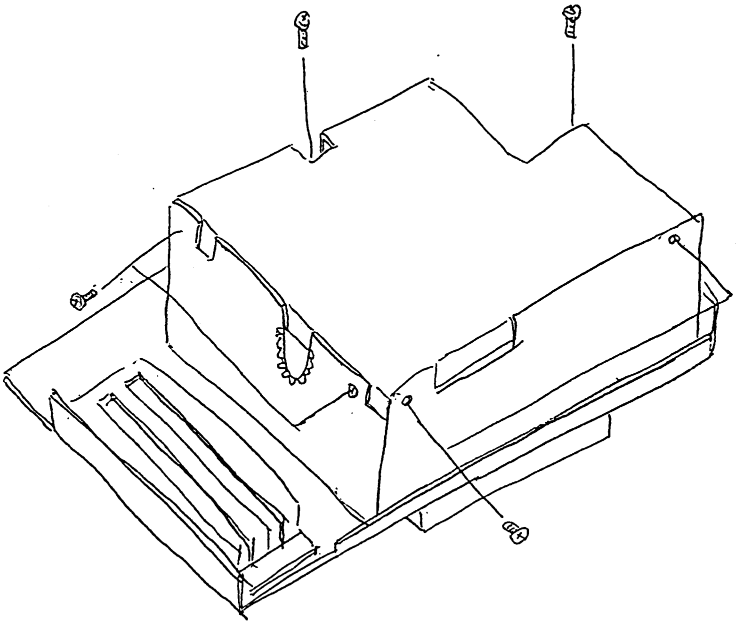
2) Pull out the rear chassis forward you.

3) Care should be given to the part of power switch and power switch holder bracket.

4) Remove the cable connector between the main unit.



5) Remove the six screws fixing the cover.



7.5 Main board

1) Remove the CRTC and PIO boards.

2) Remove the cable connector between the power unit.

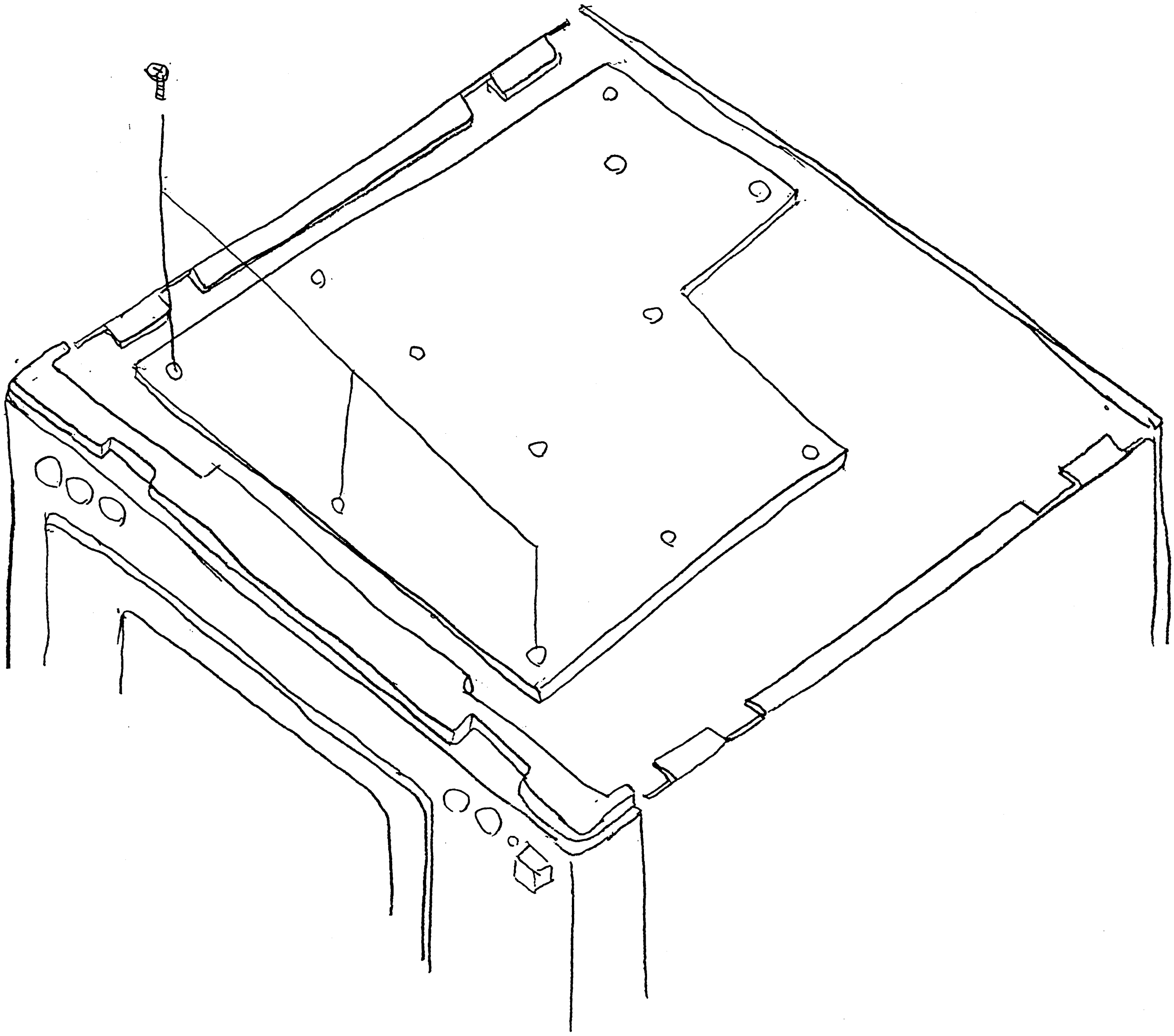
3) Remove the ROM pack.

4) Put the main unit up side down on a soft sheet.

5) Remove the bottom cover and remove the twelve screws fixing the main board.

6) Remove the cable connector between the head amplifier mother board.

7) Remove the main board from the main unit.



7.6 CRT unit

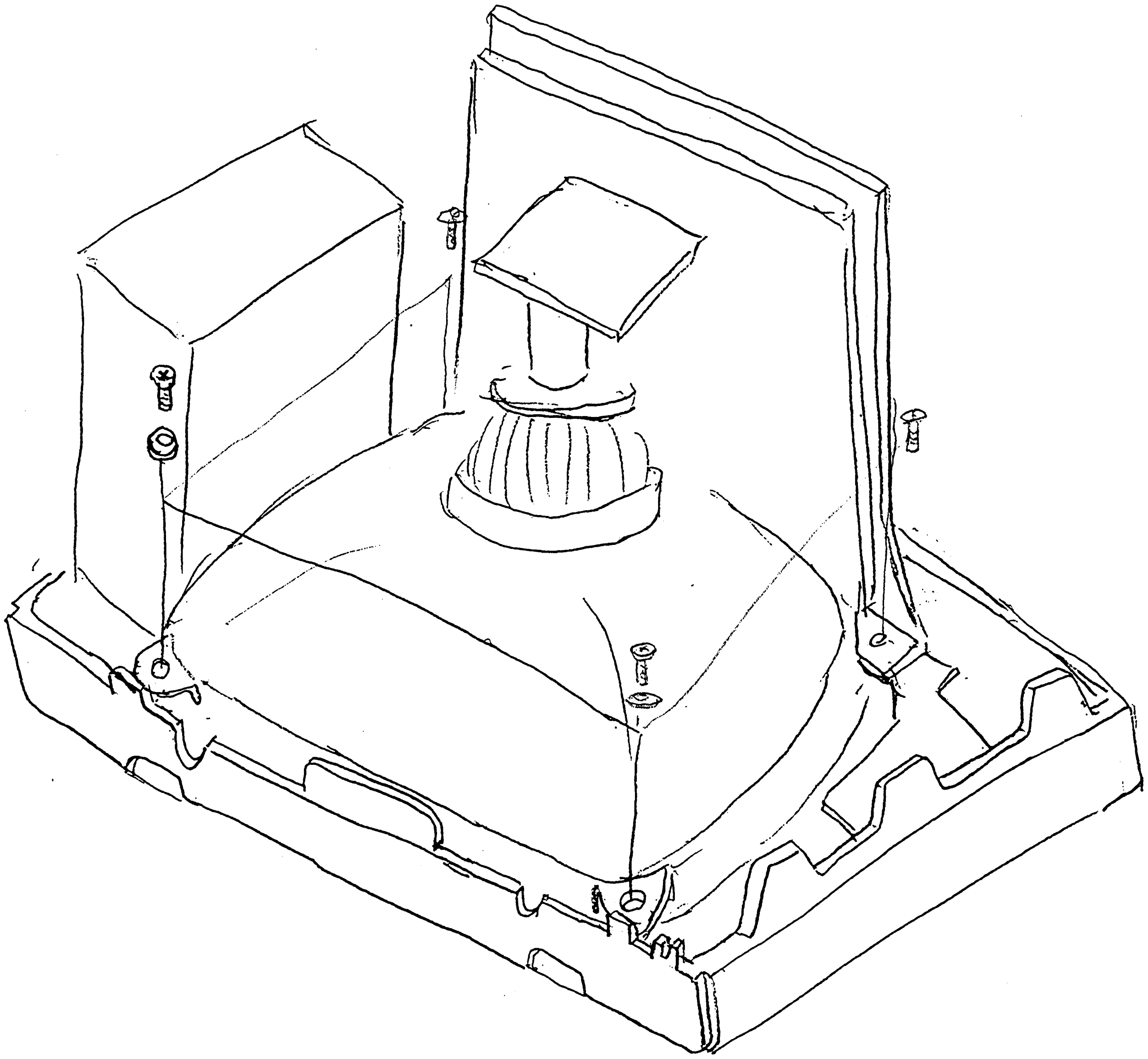
1) Remove the front panel assembly including the CRT unit.

2) Put the front panel assembly facing down.

3) Remove the four screws fixing the CRT unit.

4) Remove the CRT.

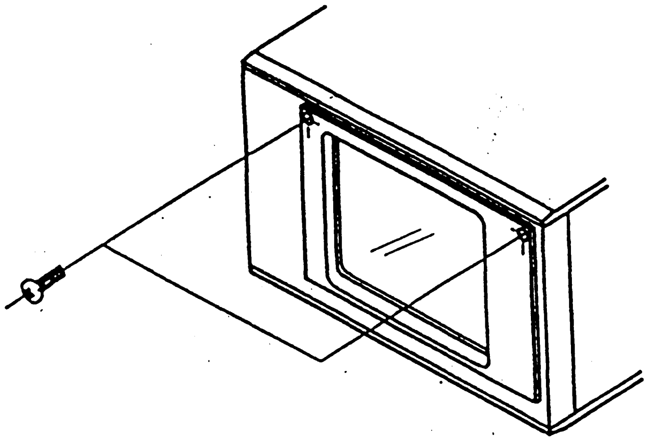
Be sure that two top screws are with flat washers.



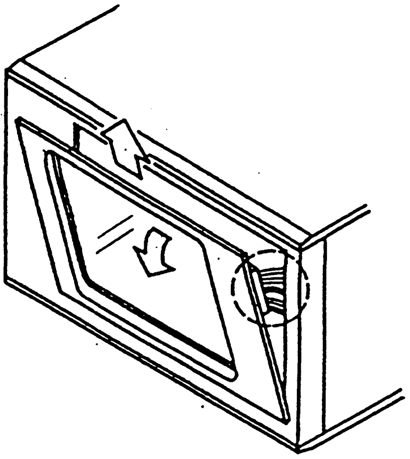
7.7 Replacement of touch key panel assembly

When toych key screen surface is broken or cracked due to drop of the unit or by touching the panel with sharp material and the key operation becomes incorrect replace the touch key panel assembly according to the instructions.

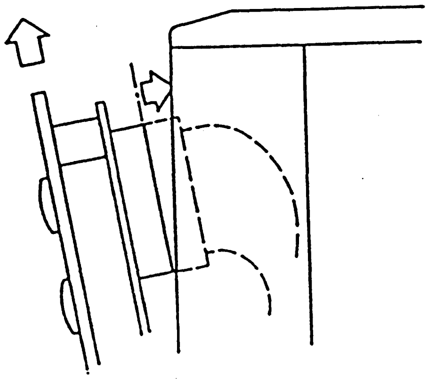
1. Remove the two screws fixing the touch key panel.



2. Take forward the top of the panel and then push it up.
3. Remove the connection cable from the operation board.



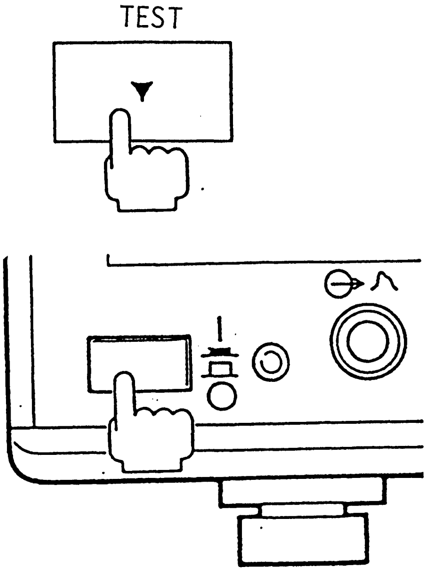
4. Replace the touch key panel and reassembly the components in the reverse prder of disassembly.

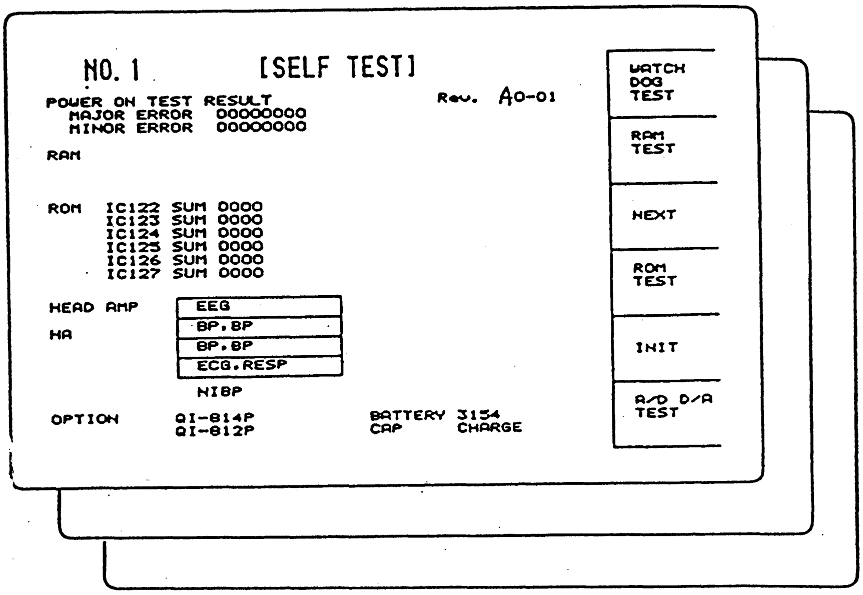


Touch key panel data setting

When the touch key panel is replaced or key touch response seems to be incorrect, touch key position assignment for the main unit is required. After data is stored in the main unit, it does not go out while power is off.

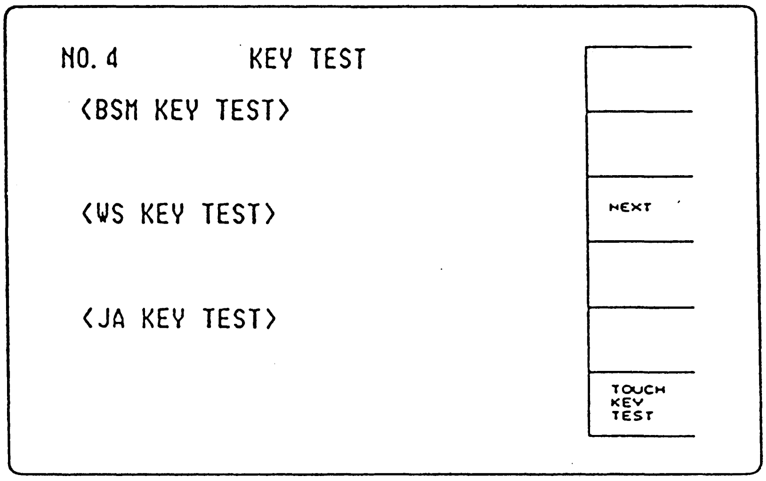
1. Turn power on of the main unit while pressing the TEST key on the front. Self Test program screen will appear on the screen.





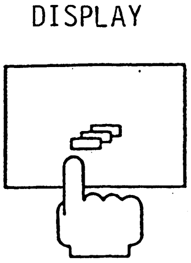
```
NO. 1            [SELF TEST]
POWER ON TEST RESULT                      Rev. A0-01
  MAJOR ERROR   00000000
  MINOR ERROR   00000000
RAM

ROM   IC122 SUM 0000
      IC123 SUM 0000
      IC124 SUM 0000
      IC125 SUM 0000
      IC126 SUM 0000
      IC127 SUM 0000
HEAD AMP   EEG
HA         BP,BP
           BP,BP
           ECG,RESP
           NIBP
OPTION     QI-814P             BATTERY  3154
           QI-812P             CAP      CHARGE
```

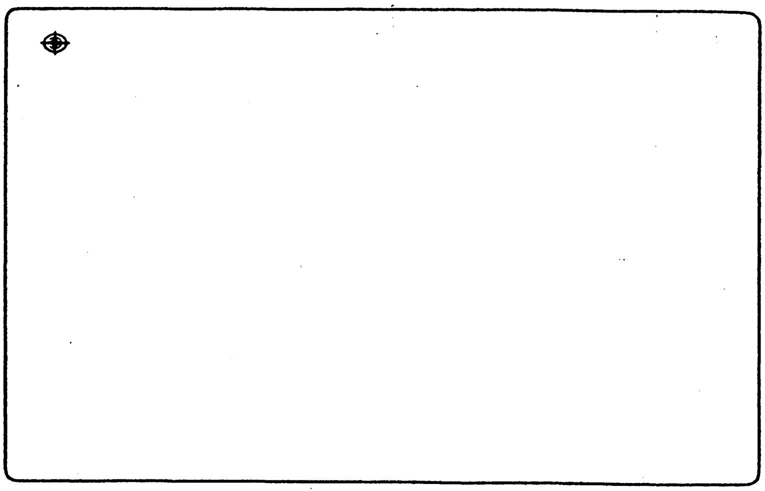
2. press the TEST key three times to call up Screen No.4 for KEY TEST.



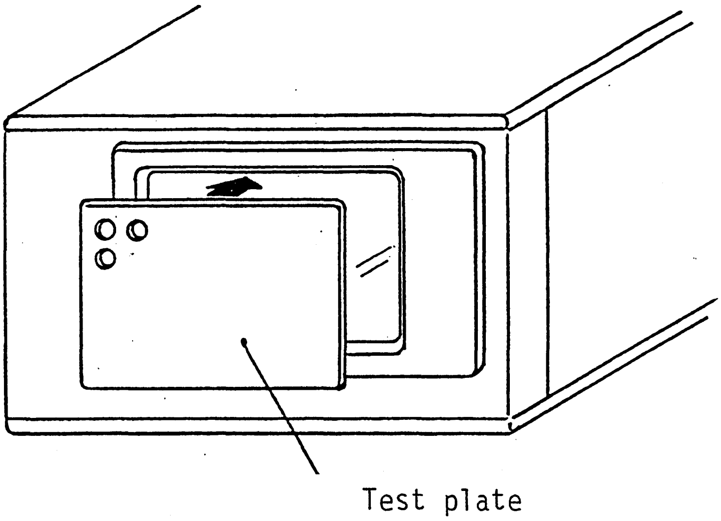
```
NO. 4          KEY TEST
 <BSM KEY TEST>


 <WS KEY TEST>


 <JA KEY TEST>
```

3. Press the DISPLAY SELECT key on the front corresponing the TOUCH KEY TEST area on the screen twice so that a mark ⊕ appears on the left top of the screen.

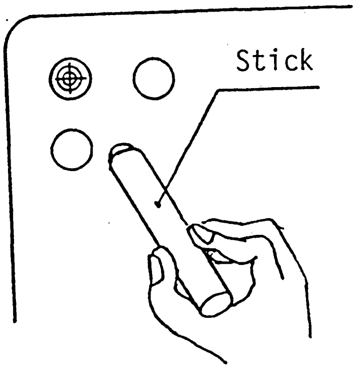




4. Set the test plate onto the frame of the CRT screen.



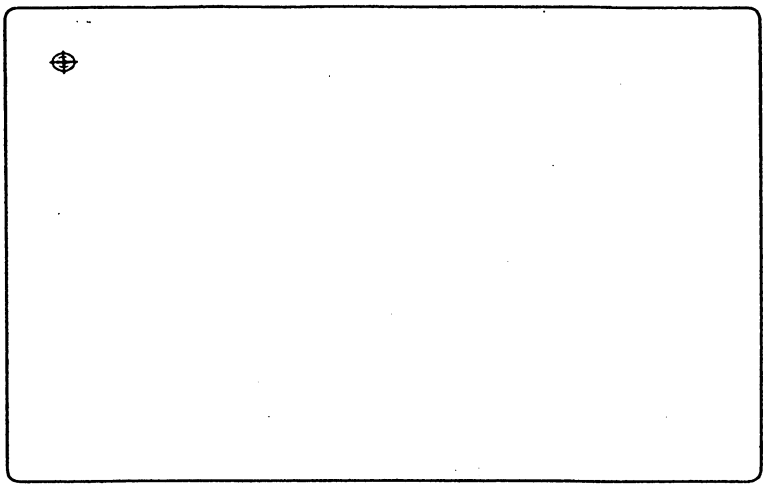
5. Push the marked surface throuh the test plate with the provided stick. The mark will move to right.



6. Push the moved mark with the test stick through the hole of the test plate.

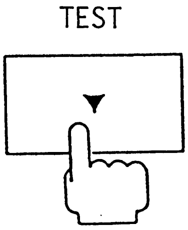
   Repeat above procedure for all marked positions in all lines until the mark returns to the left top original position on the screen.

   Be careful not to touch incorrect position othewise mistakenly set position is registered to the main unit.



7. After setting all positions, press the TEST key repeatedly until message "SELF TEST AGAIN?" appears on the screen.

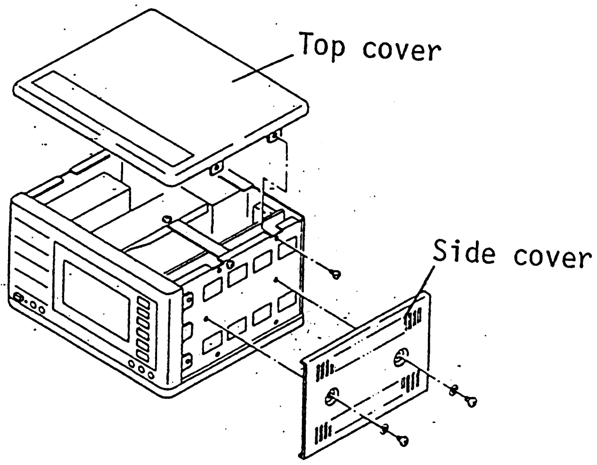
   Wail for several seconds until the screen returns to the normal operation mode.



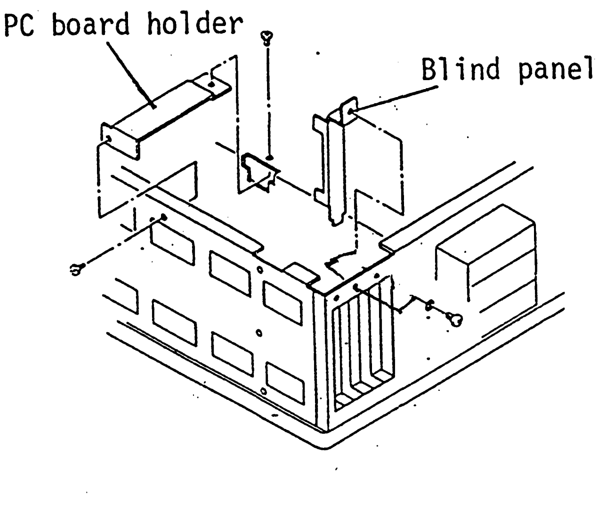
7.8 Mounting the QI-812P interface to the BSN-8300 series bedside monitor

The QI-812P interface provides two connectors, one for WS-841/821RA/J/K thermal array recorders and the other (RS-232C) for an external instrument especially a personal computer.

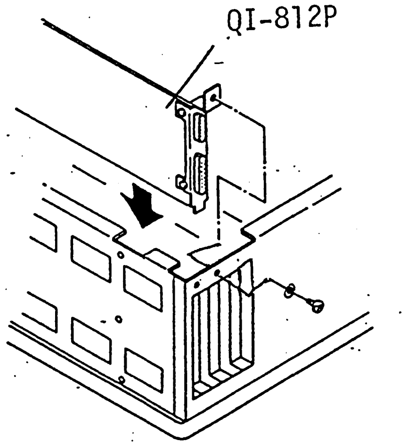
1. Remove the side covers (2 screws each) and top cover (4 screws).



2. Remove the PC board holder (2 screws) and left side blind panel (1 screw) on the rear.



3. Insert the QI-812P interface into the slot and connect it with a screw which is previously removed.

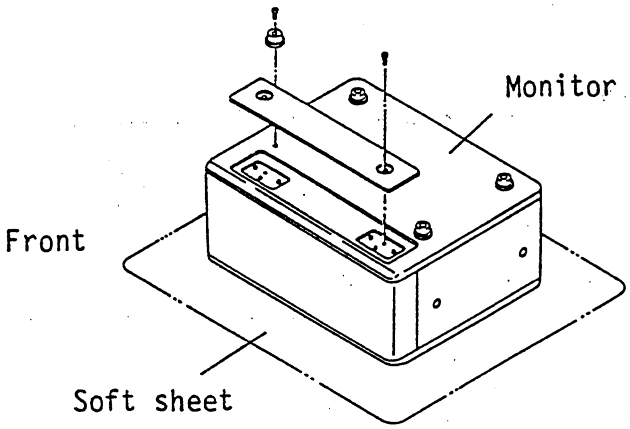


4. Assemble the units.

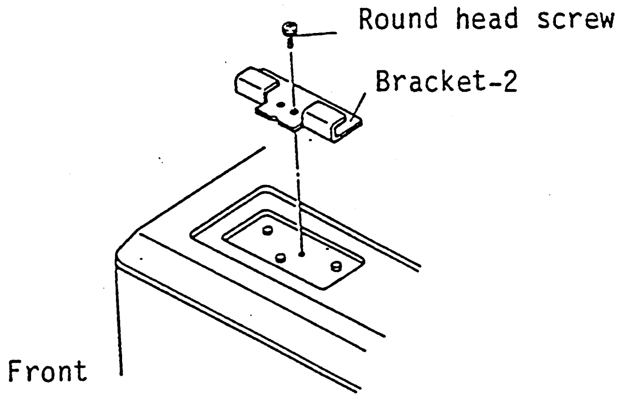
Coupling the bedside monitor and the thermal array recorder

1. Turn over the monitor and remove the 4 rubber feet and blind plate (2 screws).

   NOTE: Put the monitor on a soft sheet or paper when turning it over.

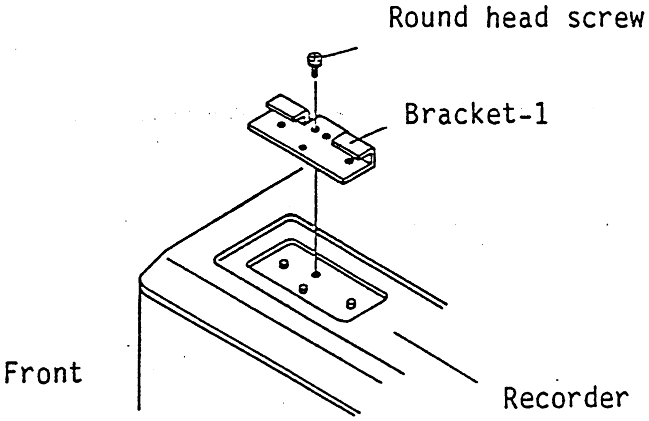

Monitor
Front
Soft sheet

2. Put the provided two coupling brackets-2 (gray color) onto the dents under the removed blind panel and secure them with screws (1pc. each).


Round head screw
Bracket-2
Front

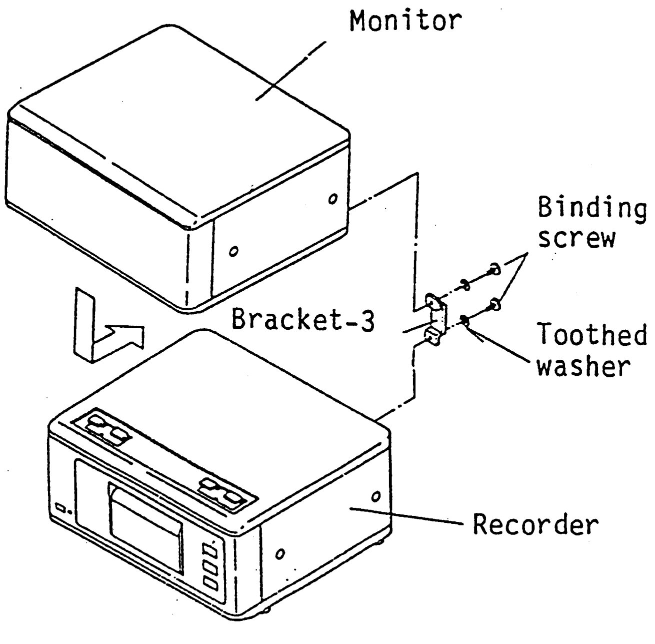
3. Remove the blind panel on the top of the thermal array recorder.

4. Put the provided two coupling brackets-1 (black color) on the dents under the removed blind panel and secure them with screws (1pc. each).

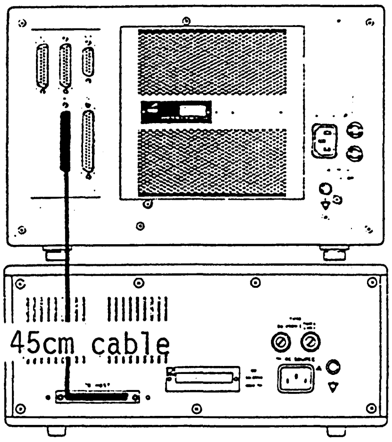

Round head screw
Bracket-1
Front
Recorder

5. Set the monitor on the top of the recorder and hook the brackets-2 with brackets-1 by sliding the monitor backwards.

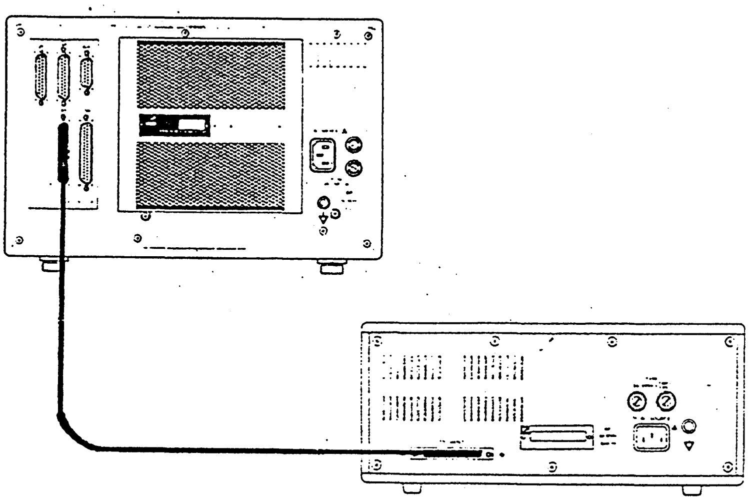
   Secure the monitor and recorder with the coupling bracket-3 and binding screws with toothed washers.


Monitor
Binding screw
Bracket-3
Toothed washer
Recorder

5. Connect the monitor and recorder with the 45cm connection cable provided with the interface when the two units are coupled.

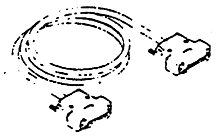


If the recorder is located separately from the monitor use the longer cable which is provided with the recorder.



Accessories of the QI-812P intreface

1



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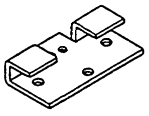

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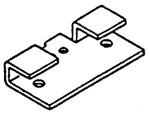

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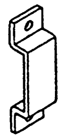

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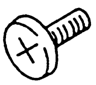


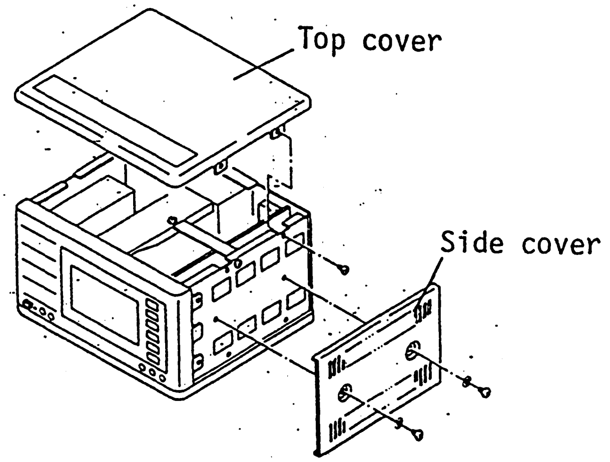
7

1.	WS connection cable YS-015P9 (45cm)	1 pc.
2.	Coupling bracket-1 (black) 1114-199694	2 pcs.
3.	Coupling bracket-2 (gray) 1114-199702	2 pcs.
4.	Coupling bracket-3 (ivory)	2 pcs.
5.	Round head screw PS4x8SUS 6410563	4 pcs.
6.	Binding screw BH4x8SUS 6402607	4 pcs.
7.	Toothed washer M4 6440557	4 pcs.

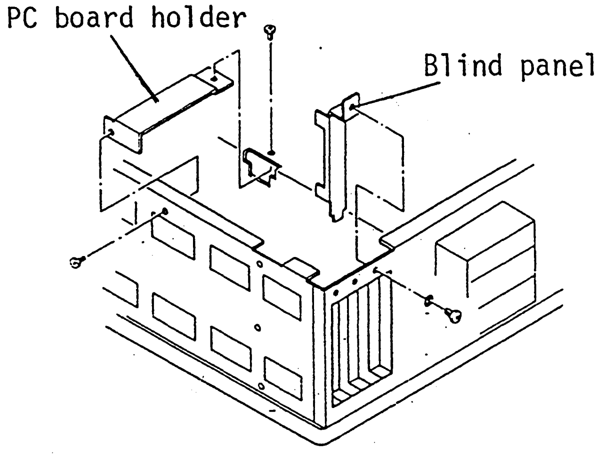
7.9 **Mounting the QI-814P interface** to the BSM-8300 series bedside monitor

The QI-814P interface provides two connectors, one for central monitor (CNS) and the other for auxiliary singal input (AUX).

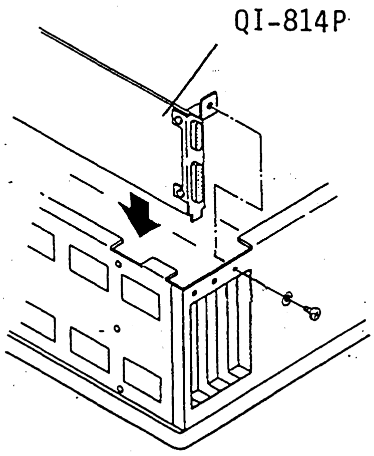
1. Remove the side covers (2 screws each) and top cover (4 screws).



2. Remove the PC board holder (2 screws) and right blind panel (1 screw) on the rear.



3. Insert the QI-814P interface into the slot and connect it with a screw which is previously removed.



4. Assemble the units.

5. Connect the monitor and signal exchanger with a connection cable.

NOTE: The connection cable should be made at the installation site.

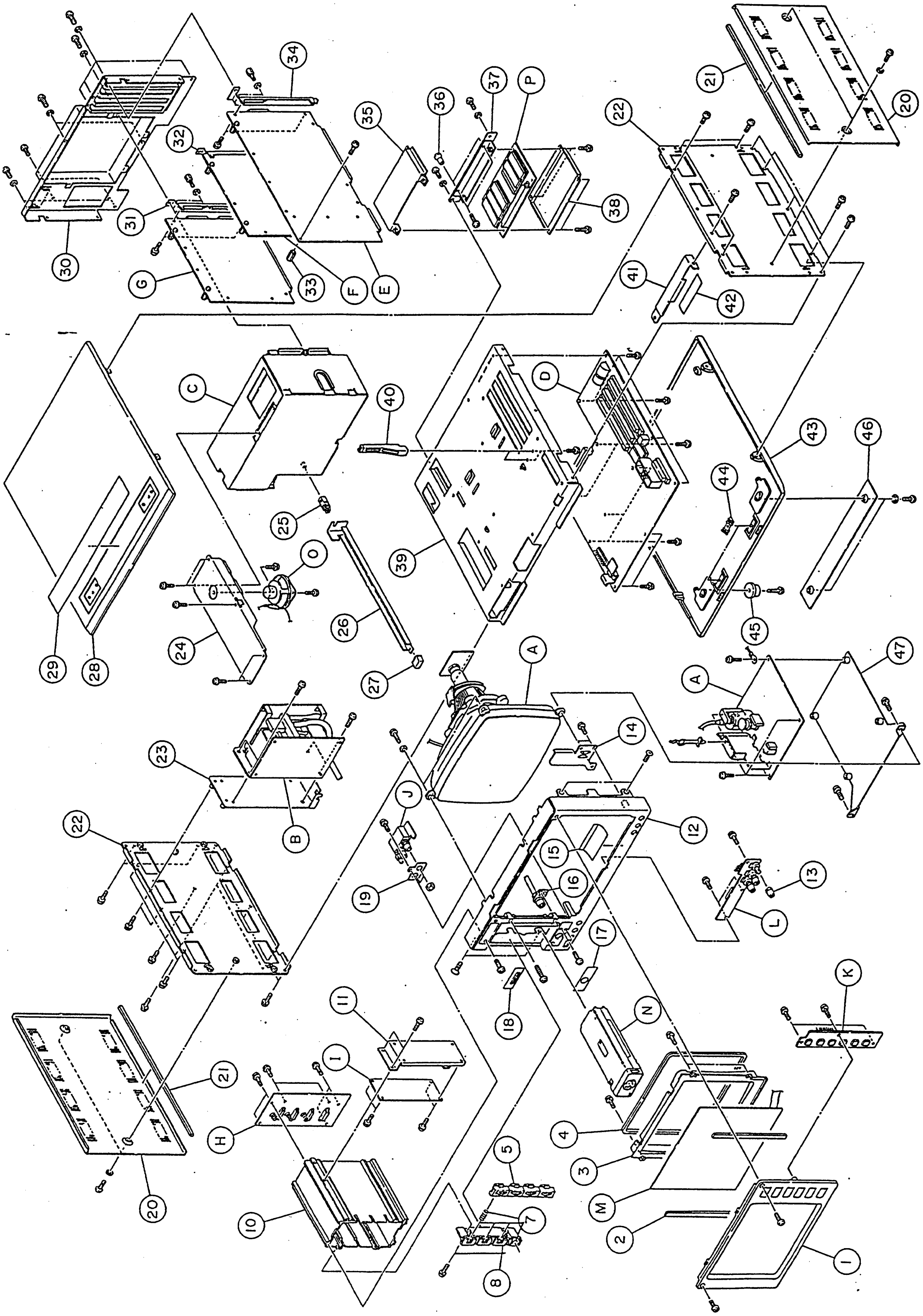
Section 8

8. Mechanical part list

8.1 MU-831R/MU-832RA/J/K bedisde monitor main unit

Index	Code No.	Description
1,2,3 M,K	YS-017P1	Touch panel frame assembly:
1	1143-006536B	Touch panel frame 1A ASSY
2	1114-212466	Dumper sponge
3	1112-016272D	Touch panel frame 2
4	1114-198686	CRT sponge
5,7,8	1114-016318	Stopper Assembly
5	1114-210539B	Amplifier unit stopper 1
7	1114-177325A	Stopper pressure spring
8	1113-055949B	Stopper holder
9	1114-210548A	Amplifier unit stopper 2
10	1113-055931E	Head amplifier case
11	1114-210566	Shield case 1
12	1123-017678C	BSM front panel
13	1114-154858	VR touch knob
14	1114-206999A	CRT holder bracket
15	1114-213901	Protection sheet
16	1114-175443	Joint holder (included in AP-712P)
17	1124-039456	Cuff panel A (MU-831RA/J/K)
	1114-207623A	Blank panel 2 (MU-832RA/J/K)
18	1124-039224A	NK mark panel
19	1114-210557A	PCB holder
20	1113-052293	Side cover 210A
21	1114-196296	Dumper sponge
22	1112-016307A	Side chassis 210A

Index	Code No.	Description
23	1114-210512A	NIBP unit holder (MU-831RA/J/K only)
24	1114-206785B	Speaker holder
25	1114-171795B	Switch holder
26	1114-210388A	BSM extender shaft
27	1114-202842C	Power switch knob
28	1112-016102B	Top cover 330
29	1123-018641	BSM caution panel A1
30	1143-005733C	BSM rear chassis assembly
31	1114-210352	Connector holder (for UP-0401, QI-814P)
32	1114-210361	Connector holder (for UP-0402, QI-812P)
33	6491457	Spacer nut, l=10 (for UP-0401, UP-0402, UP-0398)
34	1114-210334	Connector holder (for UP-0398 CRTC board)
35	1114-206811A	ROM pack shield case 10 (included in UP-0520 ROM pack)
36	1114-135683A	ROM pack knob (included in UP-0520 ROM pack)
37	1114-210477	ROM pack panel (included in UP-0520 ROM pack)
38	1113-055085B	Shield case 9 (included in UP-0520 ROM pack)
39	1112-017467C	BSM chassis
40	6001871	PCB guide 50-4010
41	1114-210503A	PCB holder
42	1114-210575	Felt sheet for PCB holder
43	1112-015718B	Bottom cover 330
44	1114-197232A	Grounding spring 1
45	1114-167087A	Rubber foot
46	1114-199658A	Sub panel
47	1114-206829A	CRT board holder
A	VM-004P	CRT unit
B	AP-712P	NIBP unit (MU-831RA/J/K)
C	SC-006P	Power supply unit (MU-831/832RA/J)
	SC-006PK	Power supplu unit (MU-831/832RK)
D	UP-0397	Main board
E	UP-0398	CRTC board
F	UP-0402	WSIF board for QI-812P
G	UP-0401	PIO board for QI-814P
H	UP-0399	Head amplifier mother board
I	UP-0519	Resp. board
J	UP-0584	Operation board-3
K	UP-0509	Operation board-2
L	UP-0400	Operation board-1
M		Touch key panel EMU-6012 (Not supplied. Order YS-017P1)
N	AC-800PA	ECG/Resp. head amplifier (MU-831/832RA)
	AC-800PJ	ECG/Resp. head amplifier (MU-831/832RJ/K)
O	US-0520A	ROM pack (including Indexes 35, 36, 37, and 38)


O
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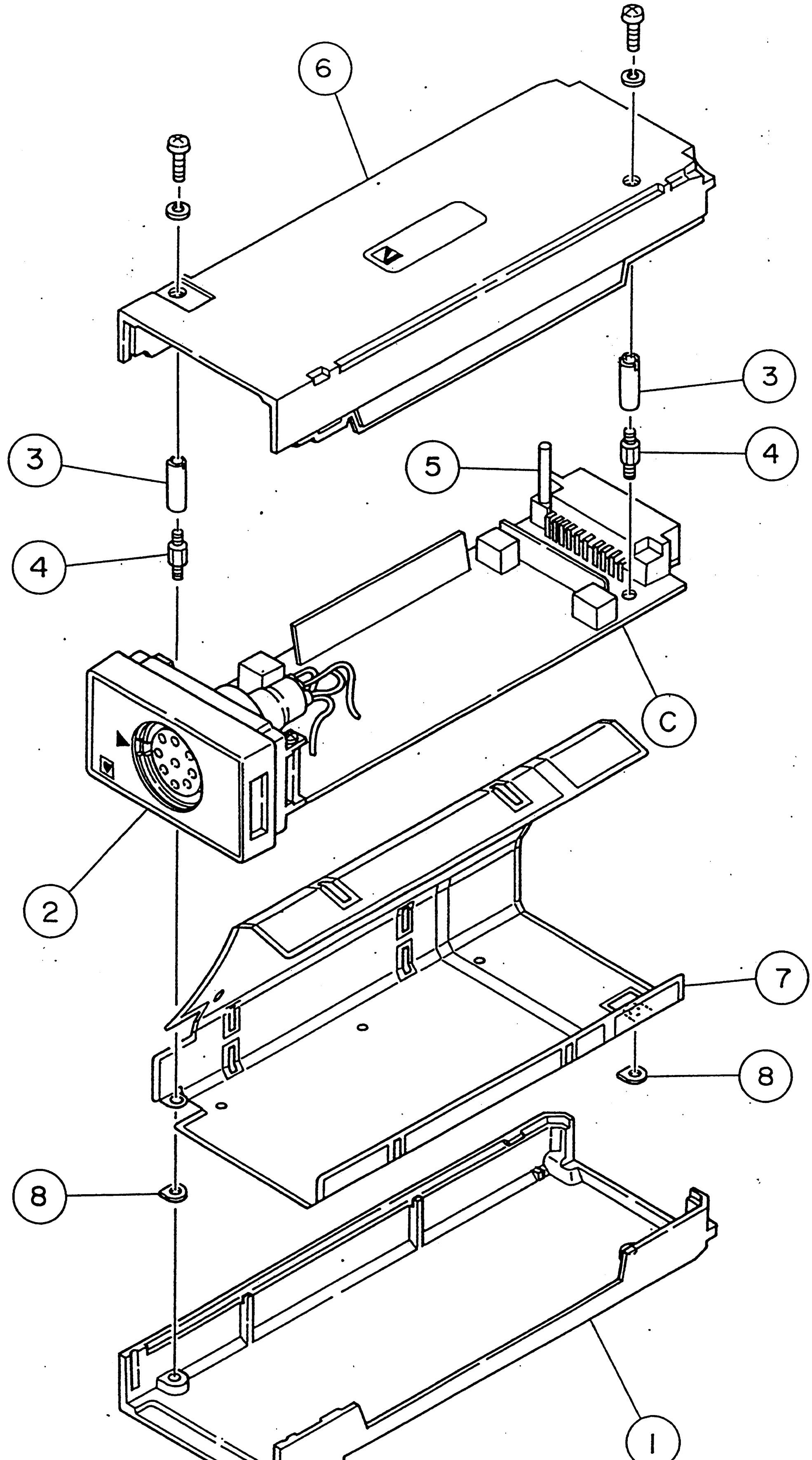
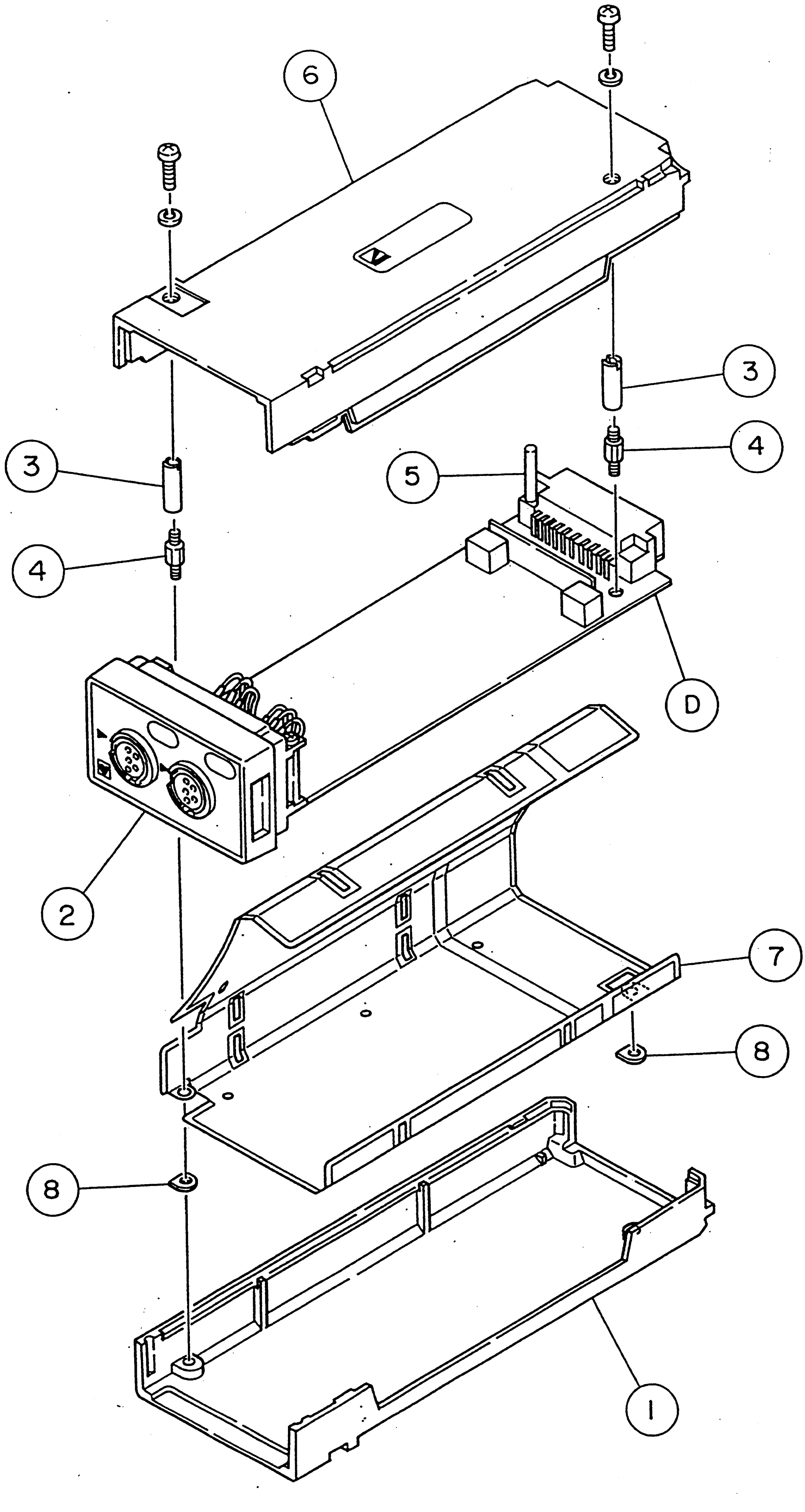
8.2 AC-800PA/PJ ECG/Resp. head amplifier

Index	Code No.	Description
1	1112-013569	Head amplifier housing (right)
2	1112-013542A	ECG input connector case
	1124-035014A	AC-800PA front panel
	1124-036601	AC-800PJ front panel
3	1114-190025B	PCB support-2
4	1114-190052	PCB support-1
5	1114-177281	Spacer
6	1112-013533	Head amplifier housing (left)
7	1113-047299	Laminated shielding plate
8	1114-205946	Spacer
C	UP-0272	ECG head amplifier board


C

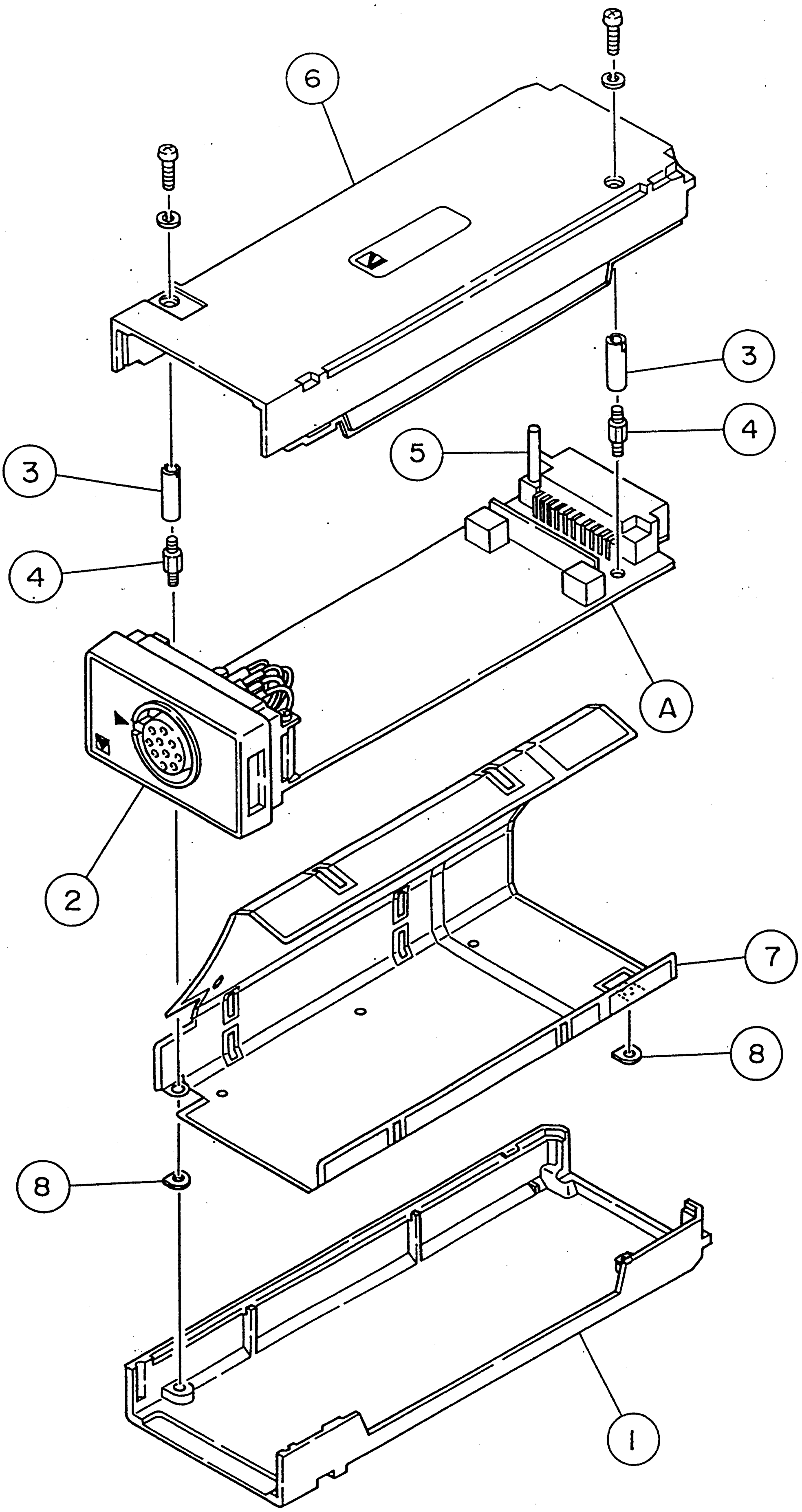
8.3 AP-800PA BP head amplifier

Index	Code No.	Description
1	1112-013569	Head amplifier housing (right)
2	1112-014238A 1124-035023C	BP input connector case AP-800PA front panel
3	1114-190025B	PCB support-2
4	1114-190052	PCB support-1
5	1114-177281	Spacer
6	1112-013533	Head amplifier housing (left)
7	1113-047299	Laminated shielding plate
8	1114-205946	Spacer
D	UP-0369	BP head amplifier board


D

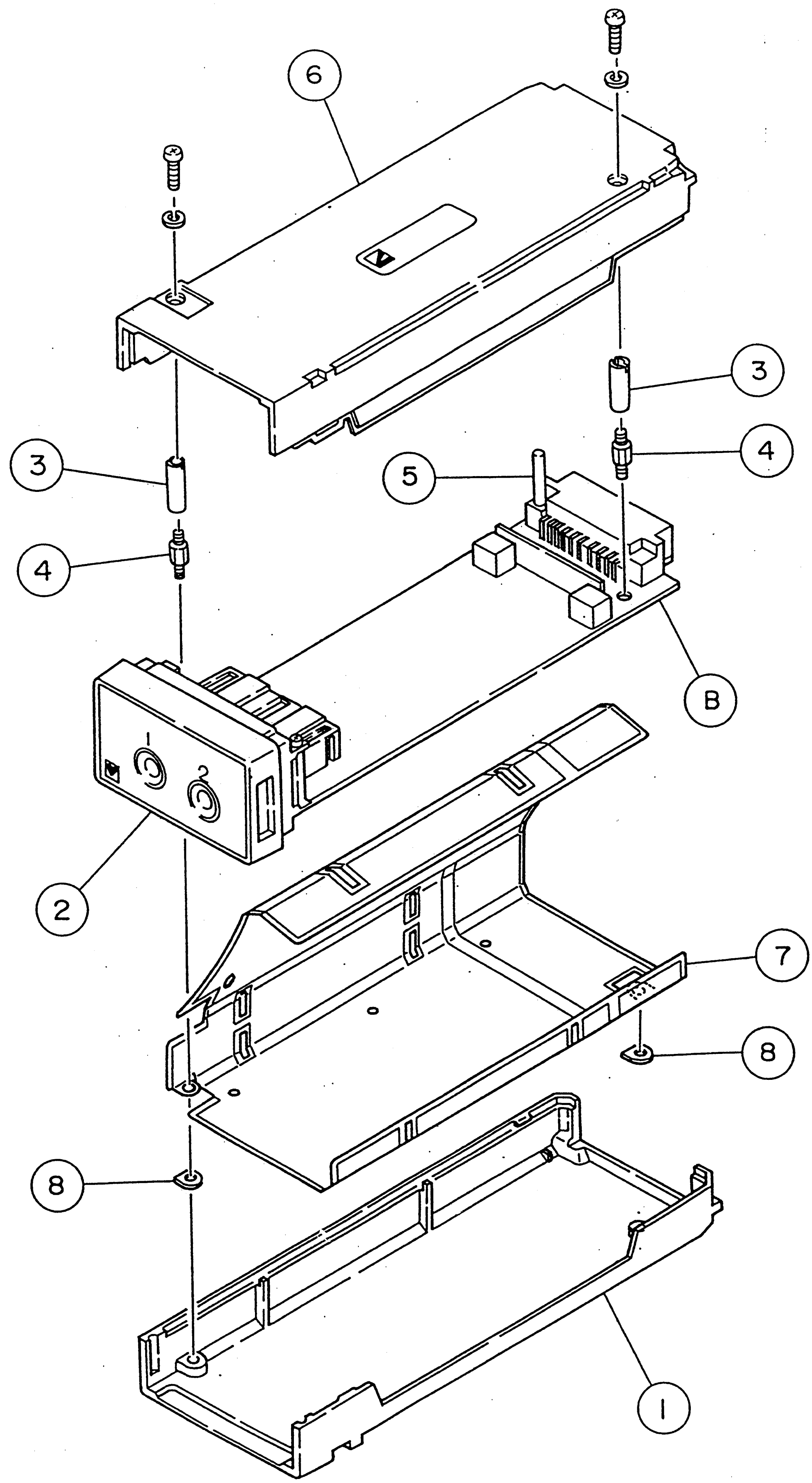
8.4 AH-800PA Cardiac output head amplifier

Index	Code No.	Description
1	1112-013569	Head amplifier housing (right)
2	1112-014211A 1124-036503	CO input connector case AH-800PA front panel
3	1114-190025A	PCB support-2
4	1114-190052	PCB support-1
5	1114-177281	Spacer
6	1112-013533	Head amplifier housing (left)
7	1113-047299	Laminated shielding plate
8	1114-205946	Spacer
A	UP-0318	CO head amplifier board


A

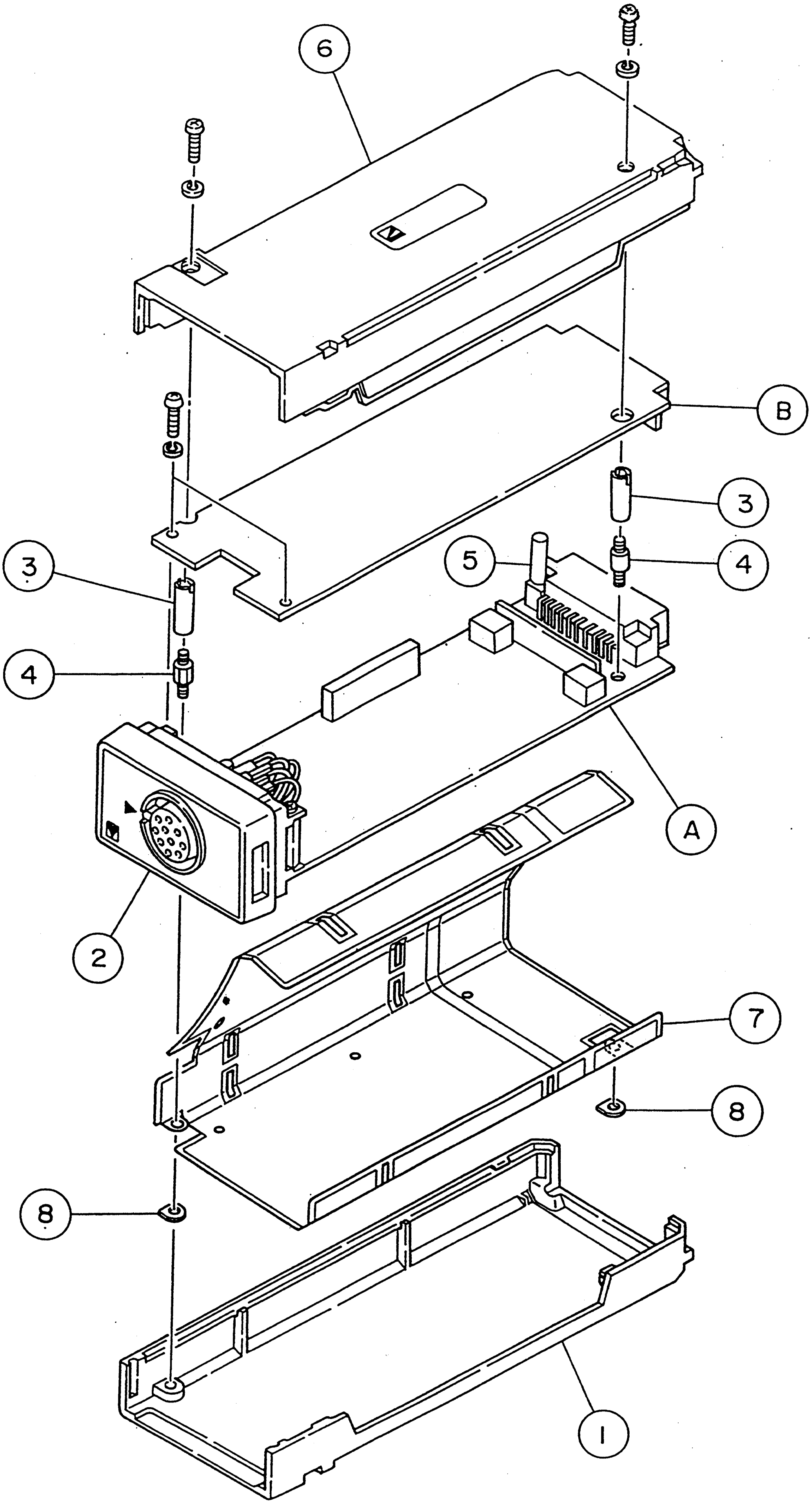
8.5 AW-800PA temperature head amplifier

Index	Code No.	Description
1	1112-013569	Head amplifier housing (right)
2	1112-013587	TEMP input connector case
	1124-035005A	AW-800PA front panel
3	1114-190025A	PCB support-2
4	1114-190052	PCB support-1
5	1114-177281	Spacer
6	1112-013533	Head amplifier housing (left)
7	1113-047299	Laminated shielding plate
8	1114-205946	Spacer
B	UP-0319	Temperature head amplifier board


B
I

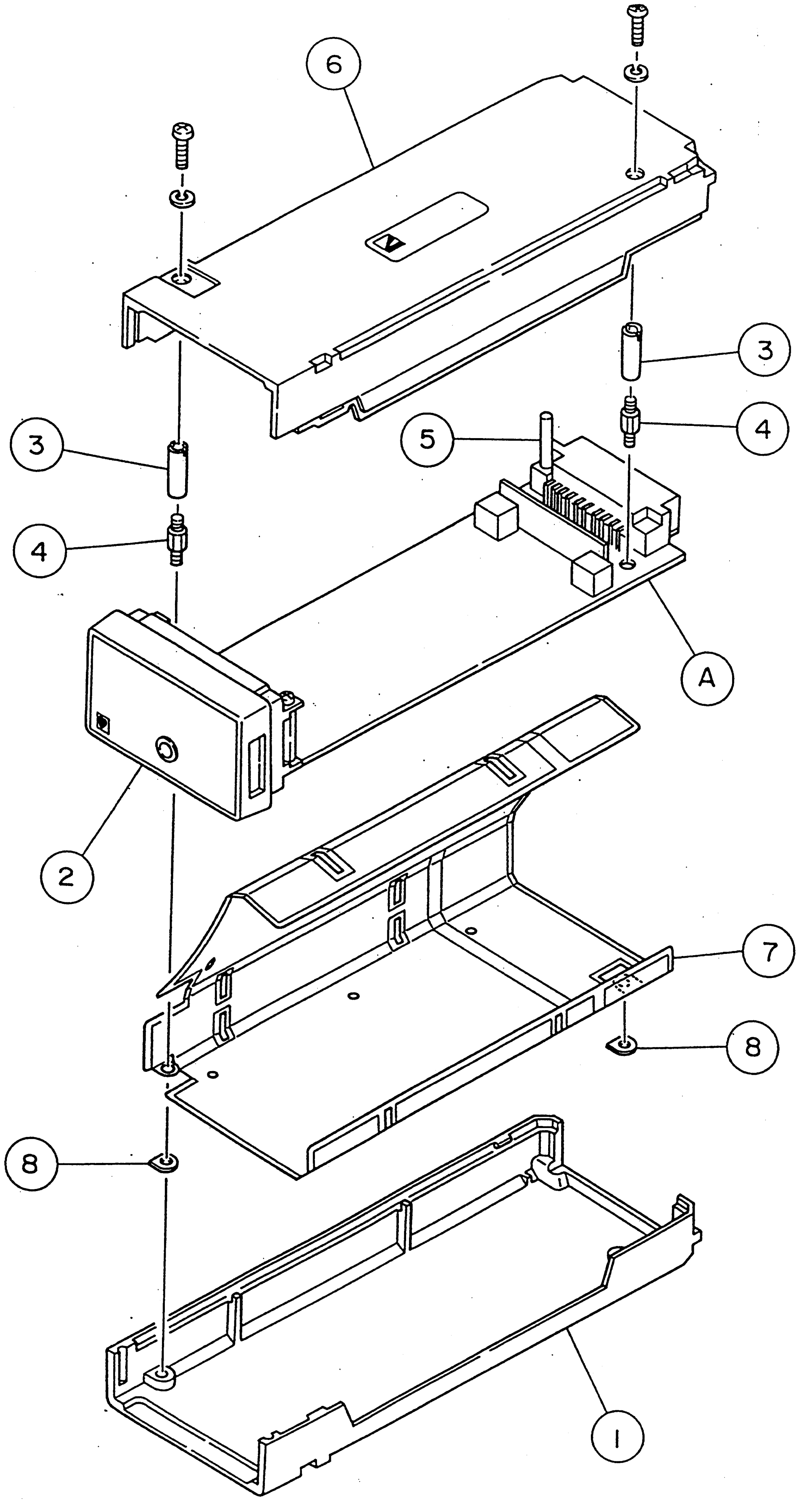
8.6 AE-800PA EEG head amplifier

Index	Code No.	Description
1	1112-013569	Head amplifier housing (right)
2	1112-014211A 1124-033132	EEG input connector case AE-800PA front panel
3	1114-190025A	PCB support-2
4	1114-190052	PCB support-1
5	1114-199738	Spacer-B
6	1112-013533	Head ampifier housing (left)
7	1113-047299	Laminated shielding plate
8	1114-205946	Spacer
A	UP-0421	EEG main board
B	UP-0422	EEG sub board


B
A

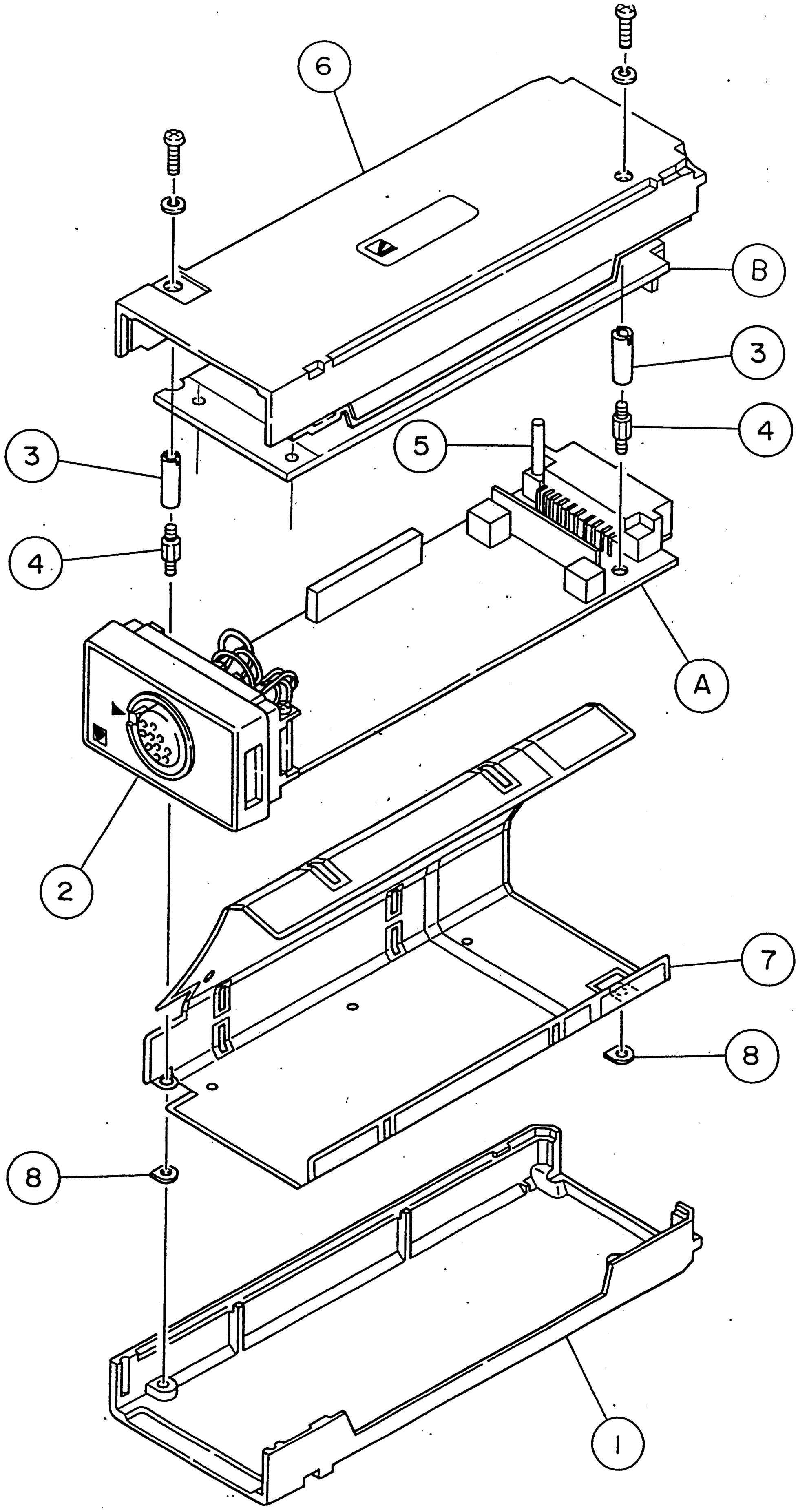
8.7 AR-800PA Respiration head amplifier

Index	Code No.	Description
1	1112-013569	Head amplifier housing (right)
2	1112-014211A 1124-038778	10P, 15P amiplifier main unit AR-800PA front panel
3	1114-190025A	PCB support-2
4	1114-190052	PCB support-1
5	1114-177281	Spacer
6	1112-013533	Head amplifier housing (left)
7	1113-047299	Laminated shielding plate
8	1114-205946	Spacer
A	UP-0548	Respiration board


A

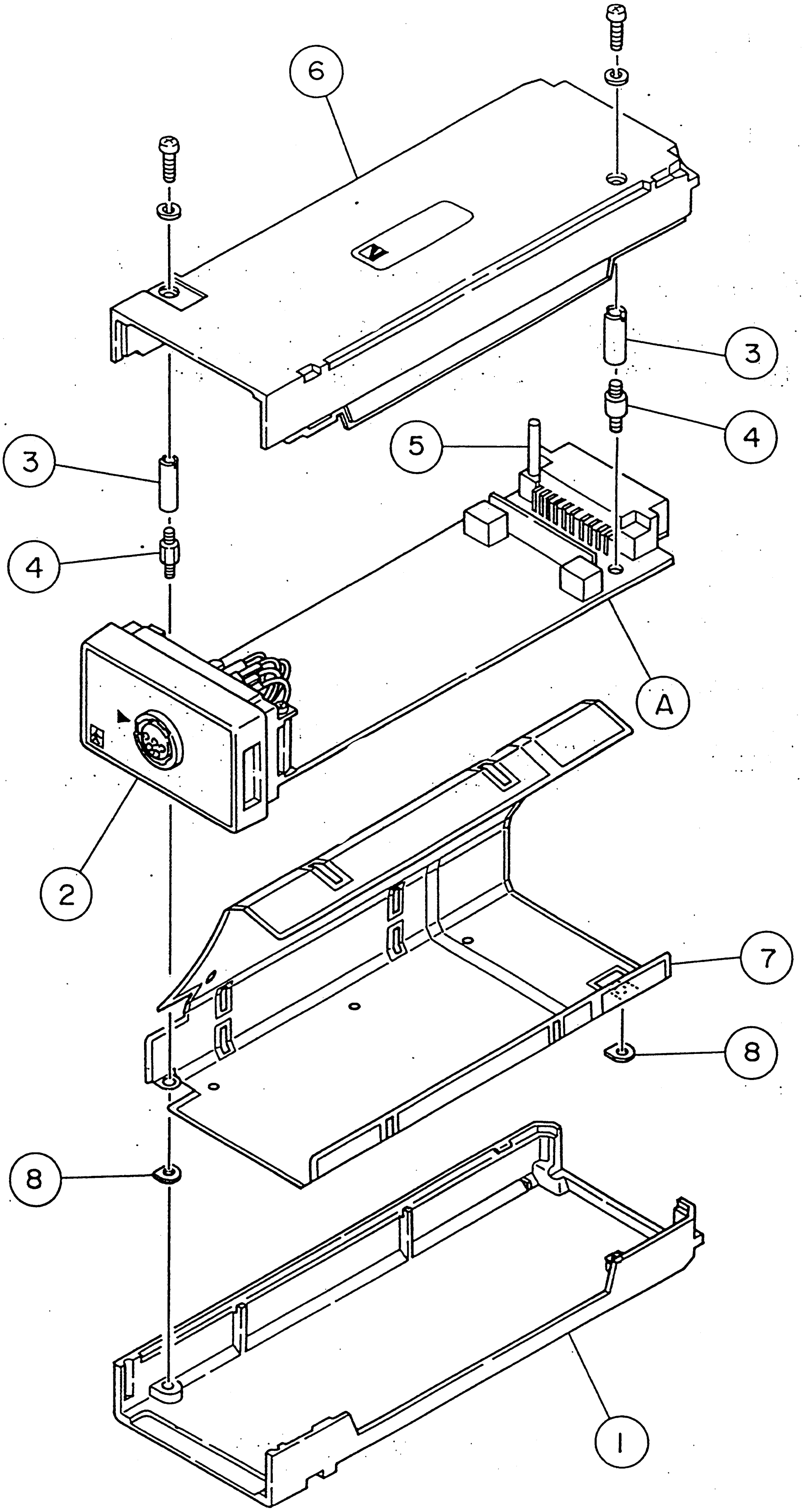
8.8 AL-800PA Sa02 head amplifier

Index	Code No.	Description
1	1112-013569	Head amplifier housing (right)
2	1112-014211A	10P, 15P ammplifier main unit
	1124-038537	AL-800PA front panel
3	1114-190025A	PCB support-2
4	1114-190052	PCB support-1
5	1114-199738	Spacer
6	1112-013533	Head amplifier housing (left)
7	1113-047299	Laminated shielding plate
8	1114-205946	Spacer
A	UP-0551	Sa02 main board
B	UP-0552	Sa02 sub board


B
A

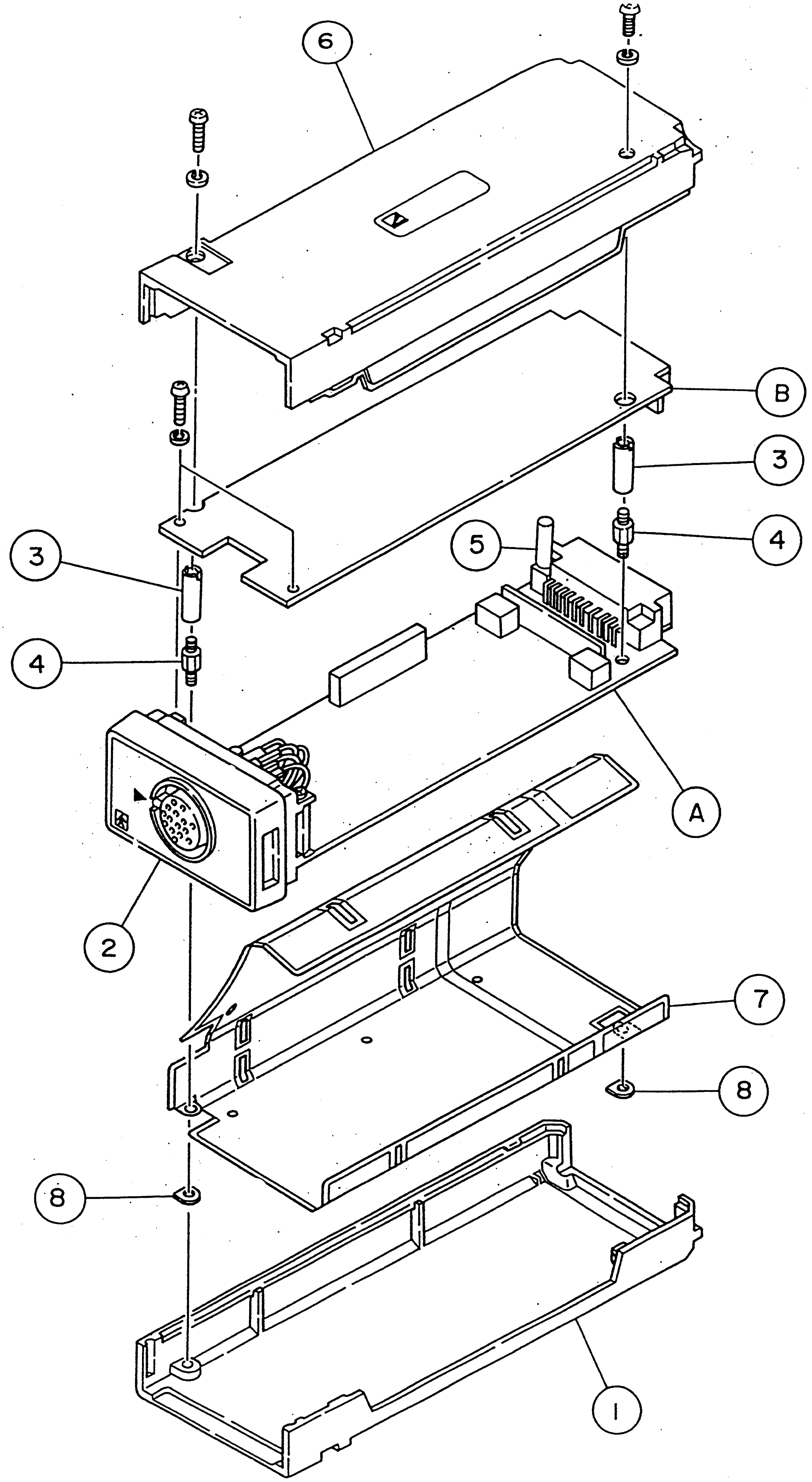
8.9 AG-820PA 02 head amplifier

Index	Code No.	Description
1	1112-013569	Amp. unit case, right
2	1112-014238A 1124-039206A	Amp. unit front frame (5p x 2) AG-820PA front panel
3	1114-190025B	PC board support-2
4	1114-190052	PC board support-1
5	1114-177281	Spacer
6	1112-013533	Amp. unit case, left
7	1113-047299	Laminated shield cover
8	1114-205946	Spacer
A	UP-0592	02 head amplifier board

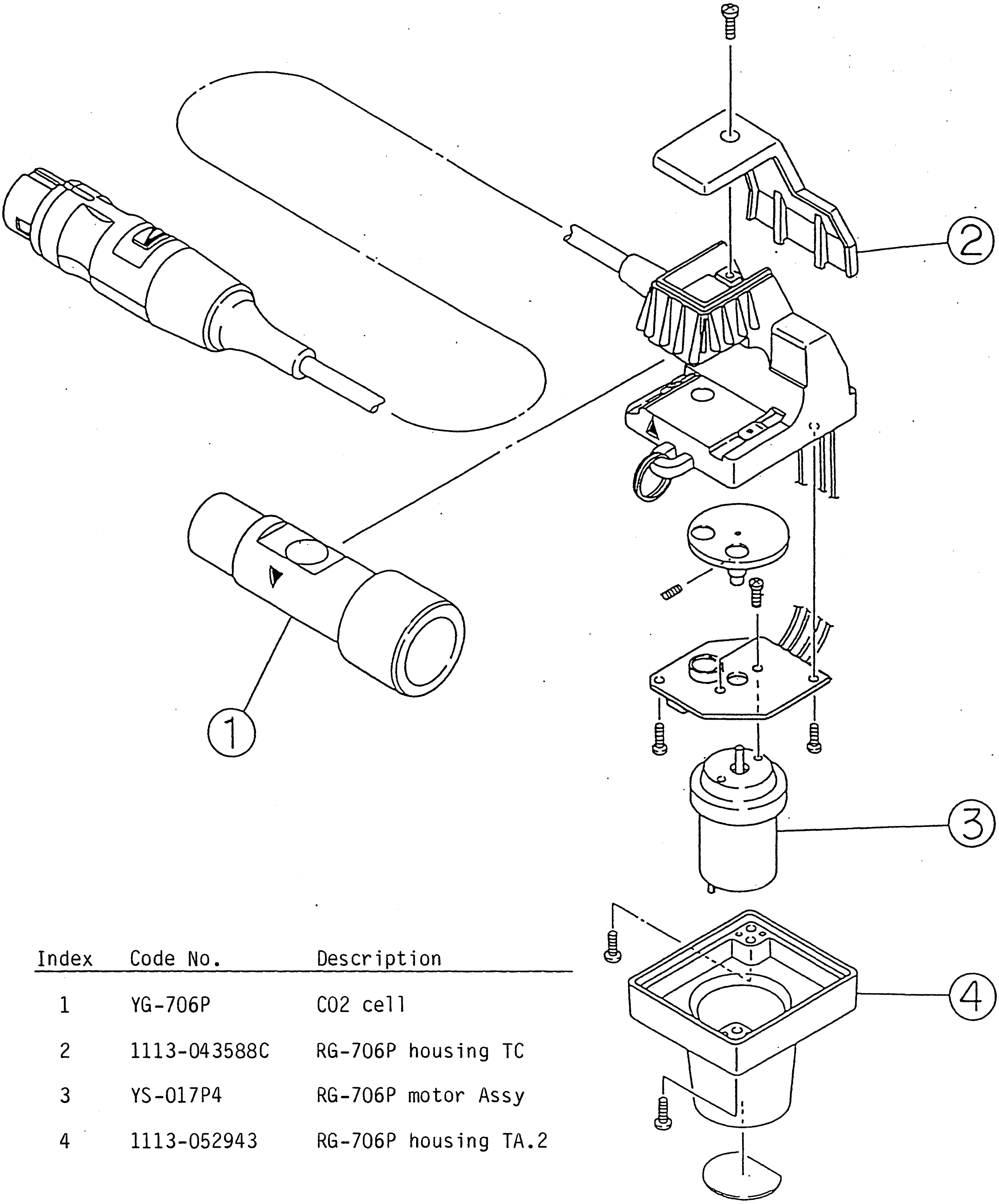

A

8.10 AG-800PA CO2 heade amplifier

Index	Code No.	Description
1	1112-013569	Amp. unit case, right
2	1112-014211A 1124-038796	Amp. unit front frame (10p, 15p) AG-800PA front panel
3	1114-190025B	PC board support.2
4	1114-190052	PC board support.1
5	1114-199738	Spacer.B
6	1112-013533	Amp. unit case, left
7	1113-047299	Laminated shield cover
8	1114-205946	Spacer
A	UP-0588	CO2 main board
B	UP-0589	CO2 sub board


B
A

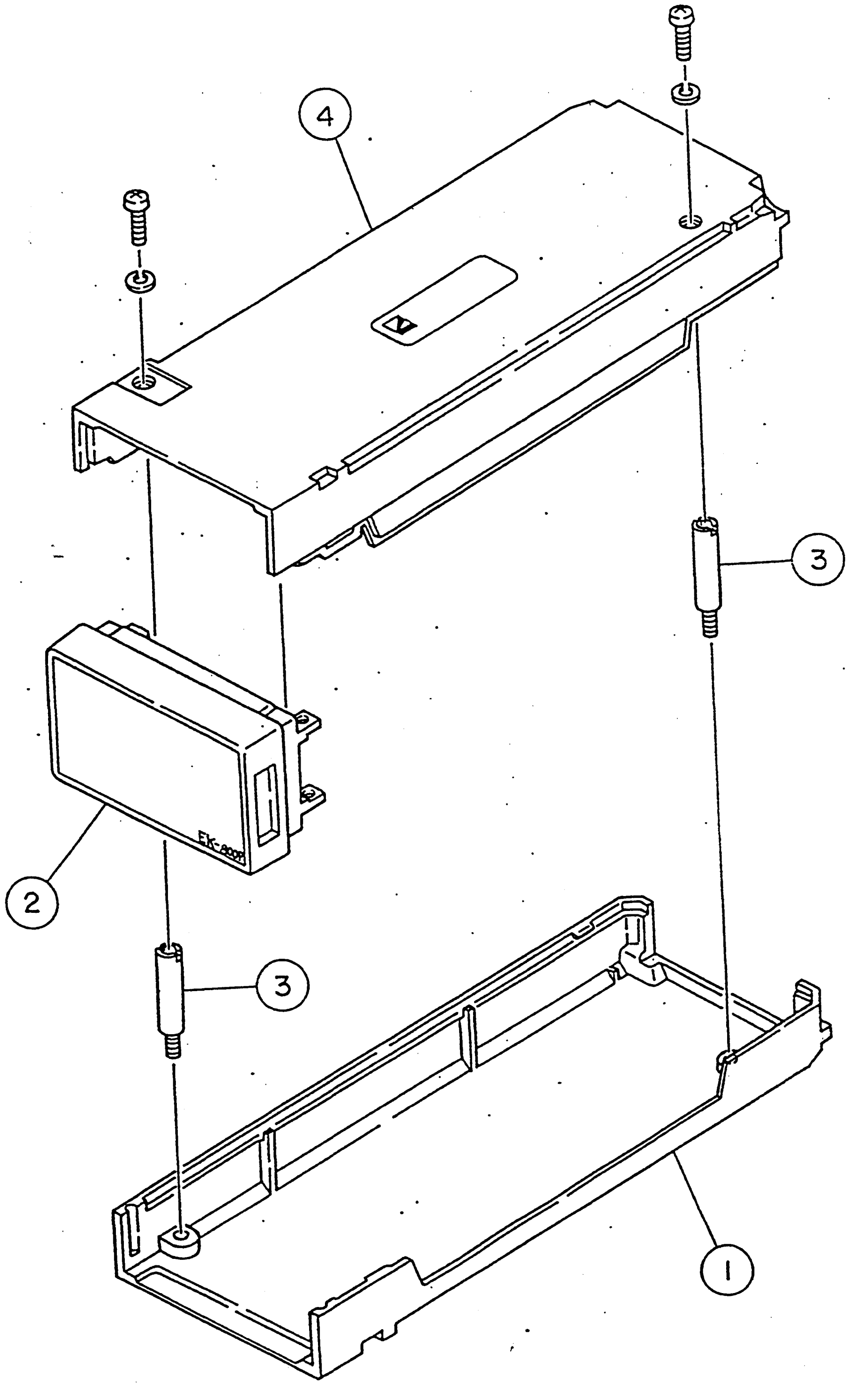
8.11 TG-706P CO2 sensor



Index	Code No.	Description
1	YG-706P	CO2 cell
2	1113-043588C	RG-706P housing TC
3	YS-017P4	RG-706P motor Assy
4	1113-052943	RG-706P housing TA.2

8.12 EK-800P Blank module

Index	Code No.	Description
1	1112-013569	Head amplifier housing (right)
2	1112-013587 1124-034987A	TEMP amplifier unit case EK-800P front panel
3	1114-171376	Housing spacer
4	1112-013533	Head amplifier housing (left)



Section 9

9. Electrical part list

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UP-0400 Operation board-1 9-13

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Abbreviations

CN CONNECTOR

ACN	Square
ACN1	Square, plug
ACN2	Square, receptacle
BCN	Card edge
CCN	Round
CCN1	Round, plug
CCN2	Round, receptacle
CN	Coaxial plug or other types
CORD	Accessory cord
NCN	Nylon connector and pins
PCN	For use on PC board, short plug, terminal board

C CAPACITOR

MPC	Metallized fim
OFC	Oil
TAC	Tantalum
TC02	Tantalum, tubelar
TC04	Tantalum, vertical
VC	Variable
C	Barium titanate, paper, etc.
CEC1	Ceramic, withstanding voltage; <100V
CEC2	Ceramic, withstanding voltage; ≥100V
CM	Module
ECB	Electrolytic, block
CE02	Electrolytic, tubelar
CE04	Electrolytic, vertical
FLC	Plastic film, ±5%
FLCB	Plastic film, Block
FLC1	Plastic film, vertical
FLC2	Plastic film, tubelar
MCC	Mica

D DIODE

D	Diode, array, for small signal
DB	Block, power, bridge
DP	Power, silicon diode, etc.
LCD	Liquid crystal idsplay
LED	Light emitting diode, LED array
LEDC	LED charactor
SCR	Silicon controlled rectifier(SCR, thyristor)
ZD1	Zenor, ≤5V
ZD2	Zenor, <10V
ZD3	Zenor, >10V

IC INTEGRATED CIRCUIT

ADIC	A/D or D/A converter
AIC	Analog (log. amp., comparator, switch, sample & hold etc.)
CPU	CPU, CPU peripheral devices (RAM, I/O port, etc.)
DIC	Digital (timer, NMOS, PMOS, registor, etc.)
MIC	CMOS
OPIC	Operational amp. buffer amp., etc
REG	Regulator
TIC	TTL

Q TRANSISTOR

TR	Uni-junction, etc.
TRA	Type 2SA; PNP, high speed
TRB	Type 2SA; PNP, low speed
TRC	Type 2SC; NPN, high speed
TRD	Type 2SD; NPN, low speed
TRP	Photo-electric device, photo-fiber, etc.
FET	**FIELD EFFECT TRANSITOR**
FET	Type 3SK/3SJ(dual gate, N-ch/P-ch)
FETJ	Type 2SJ (mono gate, P-ch)
FETK	Type 2SK (mono gate, N-ch)

SW SWITCH

ATT	Attenuator
DSW	Digital
PSW1	Push button, 1 button type
"	" " , " "
PSW9	Push button, 9 button type
PSW0	Push button, 10 button type
RSW	Rotary
SW	Micro, DIP, Toggle(tumbler), disc, etc.

T TRANSFORMER

CH	Choke coil
FBTF	Flyback
L	Inductance(coil)
MATF	Matching (IPTF, OPTF, IFTF)
PLTF	Pulse, oscillation TF
PT	Power(except for switching purpose)
T	High voltage, differential, HV unit, power supply, etc.
YOKE	Deflecting yoke

MOTOR

ACMO	AC (including gear head)
DCMO	DC (including gear head)
FAMO	Fan
PUMO	Pulse step (with gear head)

TUBE

CRT	Cathode ray tube
GA	Gas arrestor
NE	Neon tube, neon discharge tube
TUBE	Vacuum tube

R RESISTOR

RM	R module(including R and C)

RV VARIABLE RESISTOR

POT	Potentiometer
TPOT	Potentiometer on PCB, >15mm in dia.
TVR1	Carbon on PCB
TVR2	Carbon on PCB
TWVR	Wirewound on PCB
VR	On panel
VR1	On panel, ≤30mm in dia.
VR2	On panel, >30mm in dia.
WVR	Wirewound, large current

MISCELLANEOUS

GAGE	Gauge
METR	Meter, digital meter, manometer, electromagnetic counter, etc.
PRB	Pick-up, microphone, ultrasonic probe, etc.
SP	Speaker, headphone, earphone, buzzer, etc.
TD	Transducer, galvanometer coil, pressure meter, differential pressure meter
THP	Thermal/temperature sensor/probe, thermometer, etc.
SOCK	Socket, cap
FH	Fuse holder
FUSE	Fuse
TERM	Terminal, lug board, etc.
BUS	Bus bar
LAMP	Lamp. bracket
BATT	Battery, battery holder, recharger, etc.
UNIT	Display/recorder/printer/disc-drive unit, etc.
MD	Module, unit, hybrid IC, etc.
TH	Line filter, thermistor, varistor, CdS, etc.
RY	Relay, reed relay, solenoid relay
ANT	Antenna
XTAL	Crystal
HEAD	Thermal head/array, discharge head/array
VALV	Valve, electomagnetic valve,

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION

CD-056P CHASSIS PARTS-1

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
CD-056P		4600576	1	UNIT Touch key EMU-6012
CD-056P	CD001	5502395	1	CORD BSM-Y CRT Cable 2
CD-056P	CD003	5429643	1	PCN PS-22SLA(15)
CD-056P	CD004	5429697	1	PCN HKP-34F02-17BT(20)
CD-056P	CD005	5502386	1	CORD HKP-14FS01/02-13T/7BT(20)
CD-056P	CD006	5552848	1	PCN HKP-6FS02-3BT(10)
CD-056P	J001	5427592	1	PCN M62-03-0003SA(60)
CD-056P	SPK001	4700601	1	SP EAS-65P34S 16OHM

UP-0397 MAIN BOARD

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-0397		5601528	2	SOKT AXS112813
UP-0397		7412889	72	ERD-S2TJ
UP-0397		5650546	1	BATT CR17335SE-T-C7
UP-0397	C001	3853367	1	EECF5R5U105 1F/5.5V
UP-0397	C010-C014	7407128	5	267M3502-685MR
UP-0397	C020-C076	7407119	57	GR40-F104Z50T
UP-0397	C101	4312575	1	TC04 204M2002 226MB(22uF/20V)
UP-0397	C102	7407119	1	GR40-F104Z50T
UP-0397	C103	4312771	1	TC04 204M3502 475MB(4.7uF/35V)
UP-0397	C104	4317552	1	CEC2 DD05-989SL 220K500 (22pF)
UP-0397	C105	7407128	1	267M3502-685MR
UP-0397	C106-C108	7407119	3	GR40-F104Z50T
UP-0397	C301	7407119	1	GR40-F104Z50T
UP-0397	C302-C303	7407128	2	267M3502-685MR
UP-0397	C304	7407119	1	GR40-F104Z50T
UP-0397	C305	7407128	1	267M3502-685MR
UP-0397	C306-C308	7407119	3	GR40-F104Z50T
UP-0397	C309	3820928	1	FLC1 ECQP1H102JZ 1000pF
UP-0397	C310	4317579	1	CEC2 DD05-989SL 470K500 (47pF)

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-0397	C507-C509	4315269	3	FLC1 ECQ-V 1H 473JZ3 (0.047uF)
UP-0397	C510	4315385	1	FLC1 ECQ-V 1H 474JZ3 (0.47uF)
UP-0397	C701-C702	4315304	2	FLC1 ECQ-V 1H 104JZ3 (0.1uF)
UP-0397	C704	7407128	1	267M3502-685MR
UP-0397	C705-C706	7407119	2	GR40-F104Z50T
UP-0397	C707	7407128	1	267M3502-685MR
UP-0397	C709	4315304	1	FLC1 ECQ-V 1H 104JZ3 (0.1uF)
UP-0397	C710-C711	4312557	2	TC04 204M2002 106MB(10uF/20V)
UP-0397	C712	4315304	1	FLC1 ECQ-V 1H 104JZ3 (0.1uF)
UP-0397	C713-C714	7407128	2	267M3502-685MR
UP-0397	C715	4315162	1	FLC1 ECQ-B 1H 103JZ3 0.01uF
UP-0397	C801-C804	4315046	4	FLC1 ECQ-B 1H 102JZ3 0.001uF
UP-0397	C805-C806	4315162	2	FLC1 ECQ-B 1H 103JZ3 0.01uF
UP-0397	C816-C817	4315046	2	FLC1 ECQ-B 1H 102JZ3 0.001uF
UP-0397	C821	4315162	1	FLC1 ECQ-B 1H 103JZ3 0.01uF
UP-0397	C822-C823	4315144	2	FLC1 ECQ-B 1H 682JZ3 0.0068uF
UP-0397	C824-C825	4315135	2	FLC1 ECQ-B 1H 562JZ3 0.0056uF
UP-0397	C826-C827	7407119	2	GR40-F104Z50T
UP-0397	D101	7407093	1	1SS-307
UP-0397	D103	7407075	1	1SS-226
UP-0397	D301	7407075	1	1SS-226
UP-0397	D303-D305	7407093	3	1SS-307
UP-0397	D401-D404	7407101	4	RA-24M
UP-0397	D451-D452	4320022	2	D 1SS106TE Schottky
UP-0397	D453-D454	7407093	2	1SS-307
UP-0397	D501-D502	4320022	2	D 1SS106TE Schottky
UP-0397	D503-D504	7407093	2	1SS-307
UP-0397	D701-D703	7407075	3	1SS-226
UP-0397	D801	7407093	1	1SS-307
UP-0397	D802-D805	7407075	4	1SS-226
UP-0397	IC101	7406495	1	CD74AC161M
UP-0397	IC102	7406691	1	TL7705ACPS

ASSY	CKT NO.	PART NO.	Q'TY		DESCRIPTION
UP-0397	IC103	7406584	1		MC14538F
UP-0397	IC104	7406949	1		HD74HC148FP
UP-0397	IC105	7406593	1		HD68HC000CP-12
UP-0397	IC106	7406388	1		SN74LS07NS
UP-0397	IC107	1304091	1	MIC	74AC10SC TRIP 3/N NAND
UP-0397	IC108	7407012	1		HD74HC393FP
UP-0397	IC109	1304082	1	MIC	74AC04SC HEX INVERTER
UP-0397	IC111	7406397	1		74AC00SJ(CD74AC00M)
UP-0397	IC112	7406423	1		74AC139SJ(CD74AC139M)
UP-0397	IC113	1304117	1	MIC	74AC138SC 1-8 DECORDER
UP-0397	IC115-IC117	1304117	3	MIC	74AC138SC 1-8 DECORDER
UP-0397	IC118	7406503	1		CD74AC164M
UP-0397	IC119	7406423	1		74AC139SJ(CD74AC139M)
UP-0397	IC121	7406405	1		74AC32SJ(CD74AC32M)
UP-0397	IC128-IC135	7406619	8		MPD43256AGU-10L
UP-0397	IC136	1304108	1	MIC	74AC244SC OCTAL BUFFER
UP-0397	IC137	7411613	1		TMP82C51AM-10(M5M82C51FP)
UP-0397	IC138	1304108	1	MIC	74AC244SC OCTAL BUFFER
UP-0397	IC139	7406994	1		HD74HC273FP
UP-0397	IC140	7406628	1		MSM6242GS
UP-0397	IC141	7406601	1		HN58C65FPT
UP-0397	IC142	7406904	1		HD74HC00FP
UP-0397	IC143	7407003	1		HD74HC390FP
UP-0397	IC151-IC153	7406441	3		74AC373SJ(CD74AC373M)
UP-0397	IC154-IC155	7406432	2		74AC245SJ(CD74AC245M)
UP-0397	IC156	1304082	1	MIC	74AC04SC HEX INVERTER
UP-0397	IC157-IC159	7406414	3		74AC74SJ(CD74AC74M)
UP-0397	IC161-IC166	7406432	6		74AC245SJ(CD74AC245M)
UP-0397	IC167	7406486	1		CD74AC86M
UP-0397	IC301	7406557	1		JLC113JF(MC14051)
UP-0397	IC302	7406655	1		uPC812G
UP-0397	IC303	7406557	1		JLC113JF(MC14051)
UP-0397	IC304	1253386	1	AIC	uPC649C
UP-0397	IC305	7406655	1		uPC812G
UP-0397	IC306	1254215	1	ADIC	ADC574AJH 12BITADC
UP-0397	IC307	7406994	1		HD74HC273FP
UP-0397	IC308	7406575	1		MC14504F
UP-0397	IC309	1304108	1	MIC	74AC244SC OCTAL BUFFER
UP-0397	IC310	7406922	1		HD74HC04FP
UP-0397	IC311	1304108	1	MIC	74AC244SC OCTAL BUFFER
UP-0397	IC313	7406931	1		HD74HC74FP
UP-0397	IC315-IC316	7406994	2		HD74HC273FP
UP-0397	IC317	1253626	1	ADIC	HA-17012PB 12BIT DA

ASSY	CKT NO.	PART NO.	Q'TY		DESCRIPTION
UP-0397	IC318	7406655	1		uPC812G
UP-0397	IC324	7406682	1		LT1009CS8
UP-0397	IC328	7406994	1		HD74HC273FP
UP-0397	IC331-IC332	7406575	2		MC14504F
UP-0397	IC335	7406664	1		uPC458G
UP-0397	IC337	7406673	1		HA17903FS
UP-0397	IC338	7406976	1		HD74HC164FP
UP-0397	IC340	7406904	1		HD74HC00FP
UP-0397	IC341	1253314	1	REG	uPC7812H Regulator
UP-0397	IC342	1253341	1	REG	uPC7912H Regulator
UP-0397	IC401-IC405	7406655	5		uPC812G
UP-0397	IC406-IC407	7406566	2		MC14053F
UP-0397	IC408-IC409	7406655	2		uPC812G
UP-0397	IC411	7406566	1		MC14053F
UP-0397	IC451-IC452	7406655	2		uPC812G
UP-0397	IC453	7406566	1		MC14053F
UP-0397	IC454	7406646	1		uPC811G
UP-0397	IC502	7406655	1		uPC812G
UP-0397	IC503	7406566	1		MC14053F
UP-0397	IC504	7406646	1		uPC811G
UP-0397	IC701	7406655	1		uPC812G
UP-0397	IC702	7406575	1		MC14504F
UP-0397	IC703-IC704	7406388	2		SN74LS07NS
UP-0397	IC705	7406922	1		HD74HC04FP
UP-0397	IC706	7406566	1		MC14053F
UP-0397	IC707	7406655	1		uPC812G
UP-0397	IC708	7406557	1		JLC113JF(MC14051)
UP-0397	IC709	1253323	1	REG	uPC7815H Regulator
UP-0397	IC710	7406655	1		uPC812G
UP-0397	IC711	7406566	1		MC14053F
UP-0397	IC712	7406673	1		HA17903FS
UP-0397	IC714	7406922	1		HD74HC04FP
UP-0397	IC716-IC719	7407048	4		uPD74HC4094G
UP-0397	IC720-IC723	7407021	4		HD74HC597FP
UP-0397	IC724	7406967	1		HD74HC161FP
UP-0397	IC725	7407039	1		HD74HC4040FP
UP-0397	IC726	7406931	1		HD74HC74FP
UP-0397	IC727	7406913	1		HD74HC02FP
UP-0397	IC729	7406994	1		HD74HC273FP
UP-0397	IC730-IC731	7406931	2		HD74HC74FP
UP-0397	IC732	7407003	1		HD74HC390FP
UP-0397	IC733	7406958	1		HD74HC157FP
UP-0397	IC801	7407039	1		HD74HC4040FP

ASSY	CKT NO.	PART NO.	Q'TY		DESCRIPTION
UP-0397	IC802	1206491	1	CPU	MBM27C512-20CZ-G
UP-0397	IC803	7406958	1		HD74HC157FP
UP-0397	IC804	1254028	1	ADIC	MSM-5205RS Speach synthesizer
UP-0397	IC805	7407039	1		HD74HC4040FP
UP-0397	IC806	1206491	1	CPU	MBM27C512-20CZ-G
UP-0397	IC807	7406958	1		HD74HC157FP
UP-0397	IC808	1254028	1	ADIC	MSM-5205RS Speach synthesizer
UP-0397	IC809	7406985	1		HD74HC244FP
UP-0397	IC810	7406922	1		HD74HC04FP
UP-0397	IC811-IC812	7406967	2		HD74HC161FP
UP-0397	IC814	7406655	1		uPC812G
UP-0397	IC815	7406904	1		HD74HC00FP
UP-0397	IC816	7406655	1		uPC812G
UP-0397	IC817-IC818	7412158	2		TC7S32F(1gate OR)
UP-0397	IC820-IC821	7406655	2		uPC812G
UP-0397	IC822-IC823	7406566	2		MC14053F
UP-0397	IC824	7406584	1		MC14538F
UP-0397	J001	5429661	1	PCN	FFC-34BSM1#2
UP-0397	J004	5427903	1	PCN	PCN10EA-32S-2.54DSA(05)
UP-0397	J005	5429296	1	PCN	PS-22PLB-D4LT1-FL
UP-0397	J006	5415239	1	NCN	171363-1 17pin
UP-0397	J007-J009	5427948	3	PCN	PCN10EA-90S-2.54DSA(05)
UP-0397	J010	5428876	1	PCN	PCN10C-64S-2.54-DS(05)
UP-0397	J011	5445474	1	PCN	IL-2P-S3FP2-1
UP-0397	L001-L003	1706013	3	TH	BNX002-01 DC line filter
UP-0397	Q101	7407057	1		2SA-1122CC-TR
UP-0397	Q102	7407066	1		2SC-27120-TE85R
UP-0397	Q701	7407057	1		2SA-1122CC-TR
UP-0397	Q702	7407066	1		2SC-27120-TE85R
UP-0397	RA101-RA111	4093222	11	RM	EXB-F9E 103J 10K
UP-0397	R101	7411159	1		RK73K2B 47Kohm J 1/8W
UP-0397	R102-R103	7411079	2		RK73K2B 10Kohm J 1/8W
UP-0397	R104	7411195	1		RK73K2B100Kohm J 1/8W
UP-0397	R105	7411159	1		RK73K2B 47Kohm J 1/8W
UP-0397	R106	7407262	1		RK73K2B 100ohm J 1/8W
UP-0397	R107	7411319	1		RK73K2B 1 Mohm J 1/8W
UP-0397	R108-R109	7411079	2		RK73K2B 10Kohm J 1/8W
UP-0397	R110	7410953	1		RK73F2B 1 Kohm J 1/8W
UP-0397	R111	7411079	1		RK73K2B 10Kohm J 1/8W
UP-0397	R112	7410917	1		RK73K2B 470ohm J 1/8W
UP-0397	R113	7408519	1		RN73F2B 301ohm D 1/8W
UP-0397	R115	7407226	1		RK73K2B 47 ohm J 1/8W
UP-0397	R116-R123	7411079	8		RK73K2B 10Kohm J 1/8W

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-0397	R130	7411079	1	RK73K2B 10Kohm J 1/8W
UP-0397	R145-R148	7411079	4	RK73K2B 10Kohm J 1/8W
UP-0397	R218-R225	7411195	8	RK73K2B100Kohm J 1/8W
UP-0397	R228-R243	7411195	16	RK73K2B100Kohm J 1/8W
UP-0397	R301-R302	7409955	2	RN73F2B10.0KohmD 1/8W
UP-0397	R303	7411079	1	RK73K2B 10Kohm J 1/8W
UP-0397	R304-R305	7409019	2	RN73F2B1.00KohmD 1/8W
UP-0397	R307	7410231	1	RN73F2B20.0KohmD 1/8W
UP-0397	R308	7409955	1	RN73F2B10.0KohmD 1/8W
UP-0397	R309	7410392	1	RN73F2B30.1KohmD 1/8W
UP-0397	R310	7410329	1	RN73F2B24.9KohmD 1/8W
UP-0397	R311-R312	7407226	2	RK73K2B 47 ohm J 1/8W
UP-0397	R315	7409108	1	RN73F2B1.27KohmD 1/8W
UP-0397	R316	7409091	1	RN73F2B1.24KohmD 1/8W
UP-0397	R317	7408804	1	RN73F2B 604ohm D 1/8W
UP-0397	R318-R320	7409955	3	RN73F2B10.0KohmD 1/8W
UP-0397	R321	7410035	1	RN73F2B12.4KohmD 1/8W
UP-0397	R322	7411079	1	RK73K2B 10Kohm J 1/8W
UP-0397	R323	7410115	1	RN73F2B15.0KohmD 1/8W
UP-0397	R324	7410329	1	RN73F2B24.9KohmD 1/8W
UP-0397	R325	7411079	1	RK73K2B 10Kohm J 1/8W
UP-0397	R331	7410115	1	RN73F2B15.0KohmD 1/8W
UP-0397	R332	7411132	1	RK73K2B 33Kohm J 1/8W
UP-0397	R334	7407226	1	RK73K2B 47 ohm J 1/8W
UP-0397	R361-R364	7411079	4	RK73K2B 10Kohm J 1/8W
UP-0397	R365-R368	7411195	4	RK73K2B100Kohm J 1/8W
UP-0397	R401	7411195	1	RK73K2B100Kohm J 1/8W
UP-0397	R402-R403	7411079	2	RK73K2B 10Kohm J 1/8W
UP-0397	R404-R405	7409955	2	RN73F2B10.0KohmD 1/8W
UP-0397	R406	7411195	1	RK73K2B100Kohm J 1/8W
UP-0397	R407-R408	7411079	2	RK73K2B 10Kohm J 1/8W
UP-0397	R409-R410	7409955	2	RN73F2B10.0KohmD 1/8W
UP-0397	R411	7411159	1	RK73K2B 47Kohm J 1/8W
UP-0397	R412-R413	7411275	2	RK73K2B470Kohm J 1/8W
UP-0397	R414	7407226	1	RK73K2B 47 ohm J 1/8W
UP-0397	R415-R416	7411275	2	RK73K2B470Kohm J 1/8W
UP-0397	R417	7411159	1	RK73K2B 47Kohm J 1/8W
UP-0397	R418-R421	7407226	4	RK73K2B 47 ohm J 1/8W
UP-0397	R424	7408234	1	RN73F2B 150ohm D 1/8W
UP-0397	R425-R428	7409955	4	RN73F2B10.0KohmD 1/8W
UP-0397	R451-R452	7410891	2	RN73F2B 100KohmD 1/8W
UP-0397	R454	7411132	1	RK73K2B 33Kohm J 1/8W
UP-0397	R455	7410998	1	RK73K2B2.2Kohm J 1/8W

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-0397	R458	7410115	1	RN73F2B15.0KohmD 1/8W
UP-0397	R461	7409643	1	RN73F2B4.75KohmD 1/8W
UP-0397	R462	7410739	1	RN73F2B68.1KohmD 1/8W
UP-0397	R463-R464	7411319	2	RK73K2B 1 Mohm J 1/8W
UP-0397	R465	7411132	1	RK73K2B 33Kohm J 1/8W
UP-0397	R466-R467	7411079	2	RK73K2B 10Kohm J 1/8W
UP-0397	R468	7411132	1	RK73K2B 33Kohm J 1/8W
UP-0397	R469	7409456	1	RN73F2B3.01KohmD 1/8W
UP-0397	R470	7408938	1	RN73F2B 825ohm D 1/8W
UP-0397	R501-R502	7410891	2	RN73F2B 100KohmD 1/8W
UP-0397	R504	7411132	1	RK73K2B 33Kohm J 1/8W
UP-0397	R505	7410998	1	RK73K2B2.2Kohm J 1/8W
UP-0397	R508	7410115	1	RN73F2B15.0KohmD 1/8W
UP-0397	R511	7409643	1	RN73F2B4.75KohmD 1/8W
UP-0397	R512	7410739	1	RN73F2B68.1KohmD 1/8W
UP-0397	R513-R514	7411319	2	RK73K2B 1 Mohm J 1/8W
UP-0397	R515	7411132	1	RK73K2B 33Kohm J 1/8W
UP-0397	R516-R517	7411079	2	RK73K2B 10Kohm J 1/8W
UP-0397	R518	7411132	1	RK73K2B 33Kohm J 1/8W
UP-0397	R519	7409456	1	RN73F2B3.01KohmD 1/8W
UP-0397	R520	7408938	1	RN73F2B 825ohm D 1/8W
UP-0397	R701	7410953	1	RK73F2B 1 Kohm J 1/8W
UP-0397	R702	7411195	1	RK73K2B100Kohm J 1/8W
UP-0397	R703	7410953	1	RK73F2B 1 Kohm J 1/8W
UP-0397	R704	7410392	1	RN73F2B30.1KohmD 1/8W
UP-0397	R705	7409955	1	RN73F2B10.0KohmD 1/8W
UP-0397	R706	7409964	1	RN73F2B10.2KohmD 1/8W
UP-0397	R707	7409955	1	RN73F2B10.0KohmD 1/8W
UP-0397	R708	7410953	1	RK73F2B 1 Kohm J 1/8W
UP-0397	R709	7411079	1	RK73K2B 10Kohm J 1/8W
UP-0397	R710-R711	7410953	2	RK73F2B 1 Kohm J 1/8W
UP-0397	R712-R713	7410891	2	RN73F2B 100KohmD 1/8W
UP-0397	R714	7410953	1	RK73F2B 1 Kohm J 1/8W
UP-0397	R718	7410115	1	RN73F2B15.0KohmD 1/8W
UP-0397	R720-R722	7411195	3	RK73K2B100Kohm J 1/8W
UP-0397	R723	7411079	1	RK73K2B 10Kohm J 1/8W
UP-0397	R725-R728	7409955	4	RN73F2B10.0KohmD 1/8W
UP-0397	R729	7411195	1	RK73K2B100Kohm J 1/8W
UP-0397	R730	7411114	1	RK73K2B 22Kohm J 1/8W
UP-0397	R731-R735	7410953	5	RK73F2B 1 Kohm J 1/8W
UP-0397	R801-R804	7411123	4	RK73K2B 27Kohm J 1/8W
UP-0397	R805	7411275	1	RK73K2B470Kohm J 1/8W
UP-0397	R806	7411132	1	RK73K2B 33Kohm J 1/8W

ASSY	CKT NO.	PART NO.	Q'TY		DESCRIPTION
UP-0397	R807	7411195	1		RK73K2B100Kohm J 1/8W
UP-0397	R808-R809	7410998	2		RK73K2B2.2Kohm J 1/8W
UP-0397	R810	7411114	1		RK73K2B 22Kohm J 1/8W
UP-0397	R811	7407226	1		RK73K2B 47 ohm J 1/8W
UP-0397	R812-R813	7410998	2		RK73K2B2.2Kohm J 1/8W
UP-0397	R820	7410392	1		RN73F2B30.1KohmD 1/8W
UP-0397	R821-R823	7409955	3		RN73F2B10.0KohmD 1/8W
UP-0397	R824-R827	7407226	4		RK73K2B 47 ohm J 1/8W
UP-0397	R828-R829	7411079	2		RK73K2B 10Kohm J 1/8W
UP-0397	R830	7411088	1		RK73K2B 12Kohm J 1/8W
UP-0397	R831-R832	7411079	2		RK73K2B 10Kohm J 1/8W
UP-0397	R833	7411088	1		RK73K2B 12Kohm J 1/8W
UP-0397	R834	7410953	1		RK73F2B 1 Kohm J 1/8W
UP-0397	R835-R836	7411079	2		RK73K2B 10Kohm J 1/8W
UP-0397	R837	7411212	1		RK73K2B150Kohm J 1/8W
UP-0397	R838-R840	7411079	3		RK73K2B 10Kohm J 1/8W
UP-0397	R851	7411079	1		RK73K2B 10Kohm J 1/8W
UP-0397	R852	7411141	1		RK73K2B 39Kohm J 1/8W
UP-0397	R853-R854	7411079	2		RK73K2B 10Kohm J 1/8W
UP-0397	R855	7411141	1		RK73K2B 39Kohm J 1/8W
UP-0397	R856	7411079	1		RK73K2B 10Kohm J 1/8W
UP-0397	R857-R858	7410917	2		RK73K2B 470ohm J 1/8W
UP-0397	VC101	3890469	1	VC	TZ03R 300ER 5.2-30pF
UP-0397	VR301	4250071	1	TPOT	EVM-4LG 1KOHM
UP-0397	VR302-VR303	4256537	2	TPOT	EVM-4LG-A00B12
UP-0397	VR304	4256546	1	TPOT	EVM-4LG-A00B22
UP-0397	VR305	4250098	1	TPOT	EVM-4LD 10KOHM
UP-0397	VR451	4250106	1	TPOT	EVM-4LG 20KOHM
UP-0397	VR452	4250098	1	TPOT	EVM-4LD 10KOHM
UP-0397	VR501	4250106	1	TPOT	EVM-4LG 20KOHM
UP-0397	VR502	4250098	1	TPOT	EVM-4LD 10KOHM
UP-0397	VR701	4250089	1	TPOT	EVM-4LG 500OHM
UP-0397	VR820-VR821	4250044	2	TPOT	EVM-4LG 5K
UP-0397	X101	1702597	1	XTAL	KF38G 32.768KHZ

UP-0398 CRTC BOARD

ASSY	CKT NO.	PART NO.	Q'TY		DESCRIPTION
UP-0398		5423159	1	SOKT	IC SOCKET DL-2-20A(01)
UP-0398	CNJ101	5427939	1	PCN	PCN10EA-90P-2.54DS(05)
UP-0398	CNJ102	5408033	1	ACN2	RDBD-25SE-LNA FEMALE
UP-0398	CNJ103	5427663	1	PCN	M60-12-30-114P
UP-0398	CNJ105	5427895	1	PCN	PCN10EA-32P-2.54DS(05)
UP-0398	CNJ107	5428787	1	PCN	PS-20PLB-D4T1-FL1
UP-0398	CNJ108	5427636	1	PCN	M60-03-30-114P
UP-0398	C101	4312503	1	TC04	ECSZ35HS6R8B 6.8uF/35V
UP-0398	C102-C111	3810306	10	TC04	221M35V1.0MF-M1(CS04E)
UP-0398	C112-C165	7407119	54		GR40-F104Z50T
UP-0398	C167-C202	7407119	36		GR40-F104Z50T
UP-0398	C301-C303	4310176	3	EC04	ECEA1VU 100B (10uF/35V)
UP-0398	C304	4317552	1	CEC2	DD05-989SL 220K500 (22pF)
UP-0398	C305	4310211	1	EC04	ECEA1VU 101B (100uF/35V)
UP-0398	C306	4315206	1	FLC1	ECQ-B 1H 223JZ3 0.022uF
UP-0398	C307	4310211	1	EC04	ECEA1VU 101B (100uF/35V)
UP-0398	C308	4310176	1	EC04	ECEA1VU 100B (10uF/35V)
UP-0398	C309	4317552	1	CEC2	DD05-989SL 220K500 (22pF)
UP-0398	C310	4310211	1	EC04	ECEA1VU 101B (100uF/35V)
UP-0398	C311	4315206	1	FLC1	ECQ-B 1H 223JZ3 0.022uF
UP-0398	C312	3851101	1	CEC2	DD05B101K500 500V100pF
UP-0398	C401-C403	3801967	3	EC04	ECES1EU682Q
UP-0398	C404	7407119	1		GR40-F104Z50T
UP-0398	DL201-DL202	3780855	2	L	JD3010C
UP-0398	DL212-DL213	3780891	2	L	DCS10-10
UP-0398	GA101	1208328	1	CPU	Gate array ACW
UP-0398	GA102-GA103	1208319	2	CPU	Gate array DCW
UP-0398	IC101-IC104	1304108	4	MIC	74AC244SC OCTAL BUFFER
UP-0398	IC105	1304117	1	MIC	74AC138SC 1-8 DECORDER
UP-0398	IC106	7406477	1		74AC08SJ(CD74AC08M)
UP-0398	IC107	1304082	1	MIC	74AC04SC HEX INVERTER
UP-0398	IC108	7411604	1		HD74AC125FP
UP-0398	IC109	7411569	1		HD63484CP-8
UP-0398	IC110	7411587	1		HD63486CP-32
UP-0398	IC111	7411578	1		HD63485CP-32
UP-0398	IC112-IC119	1207614	8	CPU	HM53461 ZP-12 ZIP RAM
UP-0398	IC120	7406468	1		74AC02SJ(CD74AC02M)
UP-0398	IC121	7406539	1		CD74AC05M
UP-0398	IC122-IC123	1304108	2	MIC	74AC244SC OCTAL BUFFER
UP-0398	IC124	7406468	1		74AC02SJ(CD74AC02M)

ASSY	CKT NO.	PART NO.	Q'TY		DESCRIPTION
UP-0398	IC201-IC206	7406432	6		74AC245SJ(CD74AC245M)
UP-0398	IC207-IC210	7406619	4		MPD43256AGU-10L
UP-0398	IC215	7406477	1		74AC08SJ(CD74AC08M)
UP-0398	IC216-IC217	7406512	2		74AC158SJ(CD74AC158M)
UP-0398	IC218-IC219	7406414	2		74AC74SJ(CD74AC74M)
UP-0398	IC220-IC221	1304108	2	MIC	74AC244SC OCTAL BUFFER
UP-0398	IC227	7406414	1		74AC74SJ(CD74AC74M)
UP-0398	IC228	1304108	1	MIC	74AC244SC OCTAL BUFFER
UP-0398	IC230-IC237	1207614	8	CPU	HM53461 ZP-12 ZIP RAM
UP-0398	IC238-IC239	7406521	2		CD74AC299M
UP-0398	IC240-IC247	1207614	8	CPU	HM53461 ZP-12 ZIP RAM
UP-0398	IC248-IC249	7406521	2		CD74AC299M
UP-0398	IC250-IC257	1207614	8	CPU	HM53461 ZP-12 ZIP RAM
UP-0398	IC258-IC259	7406521	2		CD74AC299M
UP-0398	IC260-IC267	1207614	8	CPU	HM53461 ZP-12 ZIP RAM
UP-0398	IC268-IC269	7406521	2		CD74AC299M
UP-0398	IC270	7406459	1		74AC374SJ(CD74AC374M)
UP-0398	IC271	7406405	1		74AC32SJ(CD74AC32M)
UP-0398	IC272	7406459	1		74AC374SJ(CD74AC374M)
UP-0398	IC274	7411596	1		HD74HC4053FP
UP-0398	IC301	1204947	1	AIC	uPC1263C2 AUDIO AMP
UP-0398	L101	1706013	1	TH	BNX002-01 DC line filter
UP-0398	R101-R130	7407226	30		RK73K2B 47 ohm J 1/8W
UP-0398	R131	7411034	1		RK73K2B4.7Kohm J 1/8W
UP-0398	R133-R150	7411034	18		RK73K2B4.7Kohm J 1/8W
UP-0398	R151-R164	7407226	14		RK73K2B 47 ohm J 1/8W
UP-0398	R165	7411034	1		RK73K2B4.7Kohm J 1/8W
UP-0398	R166	7410953	1		RK73F2B 1 Kohm J 1/8W
UP-0398	R167	7410917	1		RK73K2B 470ohm J 1/8W
UP-0398	R168	7410953	1		RK73F2B 1 Kohm J 1/8W
UP-0398	R169	7411034	1		RK73K2B4.7Kohm J 1/8W
UP-0398	R170-R171	7410917	2		RK73K2B 470ohm J 1/8W
UP-0398	R172-R173	7410953	2		RK73F2B 1 Kohm J 1/8W
UP-0398	R174	7410917	1		RK73K2B 470ohm J 1/8W
UP-0398	R175	7411034	1		RK73K2B4.7Kohm J 1/8W
UP-0398	R176-R177	7410917	2		RK73K2B 470ohm J 1/8W
UP-0398	R178	7407262	1		RK73K2B 100ohm J 1/8W
UP-0398	R179	7407226	1		RK73K2B 47 ohm J 1/8W
UP-0398	R180	7407262	1		RK73K2B 100ohm J 1/8W
UP-0398	R181	7410917	1		RK73K2B 470ohm J 1/8W
UP-0398	R182-R183	7407226	2		RK73K2B 47 ohm J 1/8W
UP-0398	R184	7407262	1		RK73K2B 100ohm J 1/8W
UP-0398	R185	7410917	1		RK73K2B 470ohm J 1/8W

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-0398	R186	7407262	1	RK73K2B 100ohm J 1/8W
UP-0398	R187	7407226	1	RK73K2B 47 ohm J 1/8W
UP-0398	R188-R189	7407262	2	RK73K2B 100ohm J 1/8W
UP-0398	R190	7407226	1	RK73K2B 47 ohm J 1/8W
UP-0398	R191	7410917	1	RK73K2B 470ohm J 1/8W
UP-0398	R192	7411034	1	RK73K2B4.7Kohm J 1/8W
UP-0398	R193-R195	7407226	3	RK73K2B 47 ohm J 1/8W
UP-0398	R196	7407262	1	RK73K2B 100ohm J 1/8W
UP-0398	R197	7410953	1	RK73F2B 1 Kohm J 1/8W
UP-0398	R198	7410917	1	RK73K2B 470ohm J 1/8W
UP-0398	R201-R216	7407226	16	RK73K2B 47 ohm J 1/8W
UP-0398	R217-R218	7407262	2	RK73K2B 100ohm J 1/8W
UP-0398	R219	7411034	1	RK73K2B4.7Kohm J 1/8W
UP-0398	R220-R221	7407262	2	RK73K2B 100ohm J 1/8W
UP-0398	VR101	4161042	1	TPOT GF-06S(ET-6S)200KOHM
UP-0398	X101	1752792	1	XTAL TD308C 49.152MHZ

UP-0399 HA MOTHER BOARD

UP-0399	J001-J004	5427886	4	PCN PCN10EA-20S-2.54DSA(05)
UP-0399	J105	5429857	1	PCN HKP-20FDS2-19
UP-0399	J106	5429661	1	PCN FFC-34BSM1#2

UP-0400 OPERATION BOARD-1

UP-0400	C001	3853313	1	CEC1 D55Y5V1H104Z51 0.1uF
UP-0400	J003	5429296	1	PCN PS-22PLB-D4LT1-FL
UP-0400	J004	5422285	1	PCN HKP-14ML-7BT
UP-0400	J005	5422249	1	PCN HKP-6ML-3BT
UP-0400	VR001-VR003	4150241	3	TVR1 EVJ-2KA 5Kohm L=10

UP-0401 PIO BOARD (QI-814P central interface)

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-0401	CNJ101	5427939	1	PCN PCN10EA-90P-2.54DS(05)
UP-0401	CNJ102	5408024	1	ACN2 RDCD-37SE-LNA FEMALE
UP-0401	CNJ103	5408042	1	ACN2 RDAD-15SE-LNA FEMALE
UP-0401	CNJ104	5422249	1	PCN HKP-6ML-3BT
UP-0401	C101-C102	4312503	2	TC04 ECSZ35HS6R8B 6.8uF/35V
UP-0401	C103-C106	4317525	4	CEC1 TP D55Y5V1H 104Z 5-W
UP-0401	C107	4317579	1	CEC2 DD05-989SL 470K500 (47pF)
UP-0401	C110-C117	4315242	8	FLC1 ECQ-V 1H 333JZ3 (0.033uF)
UP-0401	C118-C125	4315233	8	FLC1 ECQ-V 1H 273JZ3 (0.027uF)
UP-0401	C201-C202	4315162	2	FLC1 ECQ-B 1H 103JZ3 0.01uF
UP-0401	C203-C204	4315189	2	FLC1 ECQ-B 1H 153JZ3 0.015uF
UP-0401	C205	4312503	1	TC04 ECSZ35HS6R8B 6.8uF/35V
UP-0401	C206	4317525	1	CEC1 TP D55Y5V1H 104Z 5-W
UP-0401	C207	4315304	1	FLC1 ECQ-V 1H 104JZ3 (0.1uF)
UP-0401	C208	4315189	1	FLC1 ECQ-B 1H 153JZ3 0.015uF
UP-0401	C209-C210	4315162	2	FLC1 ECQ-B 1H 103JZ3 0.01uF
UP-0401	C211-C213	4317525	3	CEC1 TP D55Y5V1H 104Z 5-W
UP-0401	C305	4312503	1	TC04 ECSZ35HS6R8B 6.8uF/35V
UP-0401	C306-C315	4317525	10	CEC1 TP D55Y5V1H 104Z 5-W
UP-0401	C316	4312503	1	TC04 ECSZ35HS6R8B 6.8uF/35V
UP-0401	C317-C358	4317525	42	CEC1 TP D55Y5V1H 104Z 5-W
UP-0401	D101-D120	4320031	20	D 1S2076ATE
UP-0401	D201-D208	4320022	8	D 1SS106TE Schottky
UP-0401	D209	4322528	1	D 1S2076ARE
UP-0401	D210	4325026	1	ZD2 HZ6B3LTE (5.7-6.0V)
UP-0401	D211-D216	4320031	6	D 1S2076ATE
UP-0401	IC101	1304055	1	MIC 74AC244PC OCTAL BUFFER
UP-0401	IC102	1303974	1	MIC 74AC04PC HEX INVERTER
UP-0401	IC103	1304064	1	MIC 74AC245PC OCT.BIDIR BUFF
UP-0401	IC104	1304037	1	MIC 74AC139PC DUAL 1-4DECD
UP-0401	IC105	1304144	1	MIC HD74AC164P SHIFT REG.
UP-0401	IC106	1304278	1	MIC CD74AC161E BINARY CNT
UP-0401	IC107	1303092	1	MIC HD74HC74P(uPD74HC74C)
UP-0401	IC109	1303974	1	MIC 74AC04PC HEX INVERTER
UP-0401	IC110	1304001	1	MIC 74AC32PC QUAD 21N OR
UP-0401	IC111	1207365	1	CPU uPD72001C
UP-0401	IC112-IC113	1303047	2	MIC HD74HC174P(uPD74HC174C)
UP-0401	IC116	1206758	1	TIC SN75174N LINE DRIVER
UP-0401	IC117	1252957	1	DIC AM26LS33PC QUAD L.REC.
UP-0401	IC118-IC119	1200719	2	TIC SN7406N

ASSY	CKT NO.	PART NO.	Q'TY		DESCRIPTION
UP-0401	IC123	1303092	1	MIC	HD74HC74P(uPD74HC74C)
UP-0401	IC124	1302948	1	MIC	uPD74HC08C(HD74HC08P)
UP-0401	IC125-IC126	1303974	2	MIC	74AC04PC HEX INVERTER
UP-0401	IC127	1303029	1	MIC	uPD74HC161C(HD74HC161P)
UP-0401	IC128	1303074	1	MIC	uPD74HC4040C(HD74HC4040P)
UP-0401	IC129-IC132	1304269	4	MIC	HD74HC670P 4-4 REG.
UP-0401	IC133	1301263	1	MIC	MC14504BCP
UP-0401	IC201	1253698	1	OPIC	uPC 811C(LF 411CN)
UP-0401	IC203	1251165	1	OPIC	uPC1458C
UP-0401	IC204	1253698	1	OPIC	uPC 811C(LF 411CN)
UP-0401	IC205	1301601	1	MIC	HD14538BP(MC14538BCP)
UP-0401	IC206	1303109	1	MIC	uPD74HC367C(HD74HC367P)
UP-0401	IC207	1253501	1	ADIC	uPD-7004C8CH10BITA/D
UP-0401	IC208	1251165	1	OPIC	uPC1458C
UP-0401	IC209	1253626	1	ADIC	HA-17012PB 12BIT DA
UP-0401	IC210	1253715	1	OPIC	uPC812C(LF412CN)2FET
UP-0401	IC211	1300611	1	MIC	HD14051BP(MC14051BCP)
UP-0401	IC212-IC215	1253715	4	OPIC	uPC812C(LF412CN)2FET
UP-0401	IC216	1251361	1	REG	uPC78L12J(NJM78L12A)
UP-0401	IC217	1251379	1	REG	uPC79L12J(NJM79L12A)
UP-0401	Q201-Q202	4335069	2	TRC	2SC1213AKDTZ
UP-0401	RA107	4093222	1	RM	EXB-F9E 103J 10K
UP-0401	VR101-VR102	4160979	2	TPOT	GF-06S(ET-6S)100 OHM
UP-0401	VR201	4160916	1	TPOT	GF-06S(ET-6S) 10KOHM
UP-0401	VR202	4160934	1	TPOT	GF-06S(ET-6S)500 OHM
UP-0401	VR203	4160916	1	TPOT	GF-06S(ET-6S) 10KOHM
UP-0401	VR204	4160934	1	TPOT	GF-06S(ET-6S)500 OHM
UP-0401	VR205	4160916	1	TPOT	GF-06S(ET-6S) 10KOHM

UP-0402 WSIF BOARD (QI-812P WS interface)

UP-0402	C001-C010	4317525	10	CEC1	TP D55Y5V1H 104Z 5-W
UP-0402	C011-C012	4312503	2	TC04	ECSZ35HS6R8B 6.8uF/35V
UP-0402	D101-D104	4320031	4	D	1S2076ATE
UP-0402	D301-D327	4320022	27	D	1SS106TE Schottky
UP-0402	D331-D332	0910008	2	DP	SR1FM8 800mA 400V
UP-0402	IC001	1251361	1	REG	uPC78L12J(NJM78L12A)
UP-0402	IC002	1251379	1	REG	uPC79L12J(NJM79L12A)
UP-0402	IC101-IC103	1304055	3	MIC	74AC244PC OCTAL BUFFER
UP-0402	IC104	1304064	1	MIC	74AC245PC OCT.BIDIR BUFF

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION	
UP-0402	IC105	1304144	1	MIC	HD74AC164P SHIFT REG.
UP-0402	IC106	1302966	1	MIC	uPD74HC30C(HD74HC30P)
UP-0402	IC107	1304037	1	MIC	74AC139PC DUAL 1-4DECD
UP-0402	IC108-IC109	1303974	2	MIC	74AC04PC HEX INVERTER
UP-0402	IC110	1205759	1	TIC	SN74LS07
UP-0402	IC111	1304001	1	MIC	74AC32PC QUAD 21N OR
UP-0402	IC201	1350619	1	CPU	MSM82C51ARS
UP-0402	IC202	1304278	1	MIC	CD74AC161E BINARY CNT
UP-0402	IC203	1206455	1	CPU	uPD71054C
UP-0402	IC204	1303109	1	MIC	uPD74HC367C(HD74HC367P)
UP-0402	IC206	1303047	1	MIC	HD74HC174P(uPD74HC174C)
UP-0402	IC208	1205206	1	TIC	SN75188N
UP-0402	IC209	1205198	1	TIC	SN75189AN
UP-0402	IC301	1207285	1	CPU	MB8421-12LP
UP-0402	IC302-IC304	1203966	3	TIC	SN74LS244
UP-0402	IC305	1204992	1	TIC	SN74LS641
UP-0402	J101	5427939	1	PCN	PCN10EA-90P-2.54DS(05)
UP-0402	J201	5408033	1	ACN2	RDBD-25SE-LNA FEMALE
UP-0402	J301	5408024	1	ACN2	RDCD-37SE-LNA FEMALE
UP-0402	RA201	4093222	1	RM	EXB-F9E 103J 10K
UP-0402	RA301-RA303	4093926	3	RM	EXB-F9E-152

UP-0509 OPERATION BOARD-2

UP-0509	J011	5428804	1	PCN	HBLB-6R-1
UP-0509	J012	5429679	1	PCN	FFC-14ASM4BR#2
UP-0509	S101-S106	3352088	6	SW	SKHCAD (KHC10904)

UP-0519 RESPIRATION BOARD

UP-0519	CN002	5423453	1	PCN	HKP-20M5LS-19T
UP-0519	C001	4315046	1	FLC1	ECQ-B 1H 102JZ3 0.001uF
UP-0519	C002	4315304	1	FLC1	ECQ-V 1H 104JZ3 (0.1uF)
UP-0519	C003	4315269	1	FLC1	ECQ-V 1H 473JZ3 (0.047uF)
UP-0519	C005	4317623	1	CEC2	DD05-989B 331K500 (330pF)
UP-0519	C006	4315233	1	FLC1	ECQ-V 1H 273JZ3 (0.027uF)

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-0519	C007	4315144	1	FLC1 ECQ-B 1H 682JZ3 0.0068uF
UP-0519	C008	4317597	1	CEC2 DD05-989B 101K500 (100pF)
UP-0519	C009	4315046	1	FLC1 ECQ-B 1H 102JZ3 0.001uF
UP-0519	C010	4315269	1	FLC1 ECQ-V 1H 473JZ3 (0.047uF)
UP-0519	C011	4315287	1	FLC1 ECQ-V 1H 683JZ3 (0.068uF)
UP-0519	C012	4315304	1	FLC1 ECQ-V 1H 104JZ3 (0.1uF)
UP-0519	C013	4317561	1	CEC2 DD05-989SL 330K500 (33pF)
UP-0519	C021-C022	4317525	2	CEC1 TP D55Y5V1H 104Z 5-W
UP-0519	D001-D005	4322528	5	D 1S2076ARE
UP-0519	IC001-IC004	1253715	4	OPIC uPC812C(LF412CN)2FET
UP-0519	IC005-IC006	1204867	2	AIC HA17903PS Comparator
UP-0519	IC007	1300638	1	MIC HD14053BP(MC14053BCP)
UP-0519	IC008-IC009	1300504	2	MIC HD14040BP(MC14040BCP)
UP-0519	PC001	1704345	1	TRP PC817 PHOTOCOUPLER
UP-0519	Q001	4330011	1	TRA 2SA836 C or D TZ

UP-0520 ROM PACK WITHOUT ROM CHIPS

UP-0520		5601519	6	SOKT AXS114013
UP-0520	C111-C116	7407119	6	GR40-F104Z50T
UP-0520	D001-D023	7407075	23	1SS-226
UP-0520	D031-D046	7407075	16	1SS-226
UP-0520	D071-D073	7407075	3	1SS-226
UP-0520	IC011	1304117	1	MIC 74AC138SC 1-8 DECORDER
UP-0520	IC012	1304082	1	MIC 74AC04SC HEX INVERTER
UP-0520	IC013	1304091	1	MIC 74AC10SC TRIP 3/N NAND
UP-0520	J101	5427912	1	PCN PCN10EA-64P-2.54DS(05)
UP-0520	R001-R023	7407226	23	RK73K2B 47 ohm J 1/8W
UP-0520	R031-R046	7407226	16	RK73K2B 47 ohm J 1/8W
UP-0520	R071-R073	7407226	3	RK73K2B 47 ohm J 1/8W

UP-0584 OPERATION BOARD-3

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-0584	D001	1102335	1	LED GL3KG8 3-dia green
UP-0584	J001	5445349	1	CN JACKHLJ0527-01-030
UP-0584	J021	5422249	1	PCN HKP-6ML-3BT
UP-0584		5631415	1	LAMP PC board holder PCL-490

YS-007R3 CABLE

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
YS-007R3	CD002	5502377	1	CORD PS-20SD/SLA(40)

AC-800PJ ECG HEAD AMPLIFIER

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
AC-800PJ	CN002	5395108	1	CCN2 XZ-123R (8S)

AC-800PA ECG HEAD AMPLIFIER

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
AC-800PA	CN002	5395206	1	CCN2 HR16-17R-6S 6P RECEPTACLE FEMALE

UP-0272 ECG HEAD AMPLIFIER BOARD

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-0272	CN001	5427877	1	PCN PCN10EA-20P-2.54DS(05)
UP-0272	C001-C002	3810645	2	TC04 221M 16V10uF-M1
UP-0272	C003-C004	4317525	2	CEC1 TP D55Y5V1H 104Z 5-W
UP-0272	C005	4317579	1	CEC2 DD05-989SL 470K500 (47pF)
UP-0272	C006	4317597	1	CEC2 DD05-989B 101K500 (100pF)
UP-0272	C007	4315349	1	FLC1 ECQ-V 1H 224JZ3 (0.22uF)
UP-0272	C008-C013	4315046	6	FLC1 ECQ-B 1H 102JZ3 0.001uF
UP-0272	C014-C015	3853385	2	CEC2 DE7090B 102K VA1-KC
UP-0272	D001-D004	4320031	4	D 1S2076ATE
UP-0272	D005-D006	4322519	2	D 1SS104,TPB2 (RADIAL)

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION	
UP-0272	D007-D008	4322528	2	D	1S2076ARE (RADIAL)
UP-0272	D011-D012	4322519	2	D	1SS104,TPB2 (RADIAL)
UP-0272	D013-D014	4322528	2	D	1S2076ARE (RADIAL)
UP-0272	GA001	2100389	1	GA	GAS ARRESTOR T08-800B
UP-0272	GA002-GA006	2100415	5	GA	Y06S-90B GAS ARRESTOR
UP-0272	IC001	1251601	1	REG	uPC78L05J (NJM78L05A)
UP-0272	IC002	1252494	1	REG	uPC79L05J (NJM79L05A)
UP-0272	IC003	1253715	1	OPIC	uPC812C(LF412CN)2FET
UP-0272	IC004	1300611	1	MIC	CD4051BE (MC14051BCP)
UP-0272	IC005	1301049	1	MIC	CD4094BE (MC14094BCP)
UP-0272	IC006	1300504	1	MIC	HD14040BP (MC14040BCP)
UP-0272	IC007	1601946	1	MD	EHD-HA1270 ISOLATE
UP-0272	IC008	1601964	1	MD	EHD-HA1272 ECGSEL
UP-0272	IC009-IC012	1601955	4	MD	EHD-HA1271 ECGBUF
UP-0272	PC001-PC003	0600307	3	TRP	PC810A
UP-0272	Q001	4330011	1	TRA	2SA836 C or D TZ
UP-0272	Q002	4340009	1	FETK	2SK163 L1 or L2-T
UP-0272	Q003-Q004	4335069	2	TRC	2SC1213AKDTZ
UP-0272	R001	4303424	1	MR1	SN14C2CT26 8.06KOHM F
UP-0272	R002-R003	4302559	2	MR1	SN14C2CT26 1.00KOHM F
UP-0272	R004	4303513	1	MR1	SN14C2CT26 10.0KOHM F
UP-0272	R005-R006	4304183	2	MR1	SN14C2CT26 49.9KOHM F
UP-0272	R007	4302844	1	MR1	SN14C2CT26 2.00KOHM F
UP-0272	R008	4303513	1	MR1	SN14C2CT26 10.0KOHM F
UP-0272	R009	4303228	1	MR1	SN14C2CT26 4.99KOHM F
UP-0272	R010-R011	4303513	2	MR1	SN14C2CT26 10.0KOHM F
UP-0272	R019	4304325	1	MR1	SN14C2CT26 69.8KOHM F
UP-0272	R020-R022	4302559	3	MR1	SN14C2CT26 1.00KOHM F
UP-0272	R023	4305431	1	MR1	SN14C2CT26 1.00MOHM F
UP-0272	R024-R027	4303513	4	MR1	SN14C2CT26 10.0KOHM F
UP-0272	T001	3772365	1	PLTF	T3772365 EP10PS
UP-0272	T002	3772356	1	PLTF	T3772356 EP10IS
UP-0272	T003	3772383	1	PLTF	T3772383 EP10IS(Red)
UP-0272	VR001	4160604	1	TPOT	ET-6P(GF-06P) 5KOHM

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
AP-800PA BLOOD PRESSURE HEAD AMPLIFIER				
AP-800PA	CN002-CN003	5350273	2	CCN2 HR16-13R-5S(02) Orange
UP-0369 PRESS HEAD AMP BOARD				
UP-0369	CN001	5427877	1	PCN PCN10EA-20P-2.54DS(05)
UP-0369	CN004	5427645	1	PCN M60-06-30-114P STRAIGHT
UP-0369	C001-C002	4312557	2	TC04 204M2002 106MB(10uF/20V)
UP-0369	C003-C004	4317525	2	CEC1 TP D55Y5V1H 104Z 5-W
UP-0369	C006	4315162	1	FLC1 ECQ-B 1H 103JZ3 0.01uF
UP-0369	C007	4315304	1	FLC1 ECQ-V 1H 104JZ3 (0.1uF)
UP-0369	C008-C009	4312557	2	TC04 204M2002 106MB(10uF/20V)
UP-0369	C010	4315269	1	FLC1 ECQ-V 1H 473JZ3 (0.047uF)
UP-0369	C011	4315242	1	FLC1 ECQ-V 1H 333JZ3 (0.033uF)
UP-0369	C012	4315269	1	FLC1 ECQ-V 1H 473JZ3 (0.047uF)
UP-0369	C013	4315242	1	FLC1 ECQ-V 1H 333JZ3 (0.033uF)
UP-0369	C016	4315162	1	FLC1 ECQ-B 1H 103JZ3 0.01uF
UP-0369	C017-C021	4315304	5	FLC1 ECQ-V 1H 104JZ3 (0.1uF)
UP-0369	D001-D004	4322528	4	D 1S2076ARE (RADIAL)
UP-0369	D006-D013	4322519	8	D 1SS104,TPB2 (RADIAL)
UP-0369	D014-D015	4322528	2	D 1S2076ARE (RADIAL)
UP-0369	GA001	2100389	1	GA GAS ARRESTOR T08-800B
UP-0369	IC001	1251601	1	REG uPC78L05J (NJM78L05A)
UP-0369	IC002	1252494	1	REG uPC79L05J (NJM79L05A)
UP-0369	IC003	1300638	1	MIC HD14053BP(MC14053BCP)
UP-0369	IC004	1300504	1	MIC HD14040BP (MC14040BCP)
UP-0369	IC005	1253519	1	REG LT1009CZ 2.5VREF
UP-0369	IC006	1253617	1	OPIC uPC4062C DUAL LOW POWER

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-0369	IC007-IC010	1253279	4	OPIC LT1001CN8 LOW DRIFT
UP-0369	IC011-IC013	1253617	3	OPIC uPC4062C DUAL LOW POWER
UP-0369	IC014	1601946	1	MD EHD-HA1270 ISOLATE
UP-0369	PC001	0600307	1	TRP PC810A
UP-0369	PC002	0600263	1	TRP PC-827 PHOTOCOUPLER DUAL
UP-0369	Q001-Q003	4335069	3	TRC 2SC1213AKDTZ
UP-0369	Q004	0100384	1	TRA 2SA673AC
UP-0369	Q005	4335069	1	TRC 2SC1213AKDTZ
UP-0369	RA001	4093196	1	RM EXB-F8V 103J 10K
UP-0369	RA002	4093632	1	RM EXB-F5E-105
UP-0369	R001	4303513	1	MR1 SN14C2CT26 10.0KOHM F
UP-0369	R002	4302559	1	MR1 SN14C2CT26 1.00KOHM F
UP-0369	R003	4303166	1	MR1 SN14C2CT26 4.32KOHM F
UP-0369	R004	4303567	1	MR1 SN14C2CT26 11.3KOHM F
UP-0369	R005	4303897	1	MR1 SN14C2CT26 24.9KOHM F
UP-0369	R006	4304183	1	MR1 SN14C2CT26 49.9KOHM F
UP-0369	R007	4302844	1	MR1 SN14C2CT26 2.00KOHM F
UP-0369	R008-R011	4303513	4	MR1 SN14C2CT26 10.0KOHM F
UP-0369	R012	4303977	1	MR1 SN14C2CT26 30.1KOHM F
UP-0369	R013	4302559	1	MR1 SN14C2CT26 1.00KOHM F
UP-0369	R014	4303513	1	MR1 SN14C2CT26 10.0KOHM F
UP-0369	R015-R016	4303014	2	MR1 SN14C2CT26 3.01KOHM F
UP-0369	R017	4302559	1	MR1 SN14C2CT26 1.00KOHM F
UP-0369	R018	4303513	1	MR1 SN14C2CT26 10.0KOHM F
UP-0369	R019-R020	4304477	2	MR1 SN14C2CT26 100KOHM F
UP-0369	R021	4304183	1	MR1 SN14C2CT26 49.9KOHM F
UP-0369	R026-R029	4304477	4	MR1 SN14C2CT26 100KOHM F
UP-0369	R030-R031	4302844	2	MR1 SN14C2CT26 2.00KOHM F
UP-0369	R032-R035	4303513	4	MR1 SN14C2CT26 10.0KOHM F
UP-0369	R036-R039	4303843	4	MR1 SN14C2CT26 22.1KOHM F
UP-0369	R040-R043	4304477	4	MR1 SN14C2CT26 100KOHM F
UP-0369	R046	4301301	1	MR1 SN14C2CT26 49.9 OHM F
UP-0369	R047	4304477	1	MR1 SN14C2CT26 100KOHM F
UP-0369	T001	3772365	1	PLTF T3772365 EP10PS
UP-0369	T002	3772356	1	PLTF T3772356 EP10IS
UP-0369	VR001-VR002	4160792	2	TPOT GF06P 200 OHM

AH-800PA CARDIAC OUTPUT HEAD AMPLIFIER

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
AH-800PA	CN002	5350344	1	CCN2 HR16-18R-10S(01) Red

UP-0318 CO HEAD AMP BOARD

UP-0318	CN001	5427877	1	PCN PCN10EA-20P-2.54DS(05)
UP-0318	CN003	5428234	1	PCN M60-04-30-114P
UP-0318	C001-C002	4312557	2	TC04 204M2002 106MB(10uF/20V)
UP-0318	C003-C004	4317525	2	CEC1 TP D55Y5V1H 104Z 5-W
UP-0318	C006	4315162	1	FLC1 ECQ-B 1H 103JZ3 0.01uF
UP-0318	C007	3810645	1	TC04 221M 16V10uF-M1
UP-0318	C008	4315162	1	FLC1 ECQ-B 1H 103JZ3 0.01uF
UP-0318	C009-C012	4315304	4	FLC1 ECQ-V 1H 104JZ3 (0.1uF)
UP-0318	C013-C014	4315162	2	FLC1 ECQ-B 1H 103JZ3 0.01uF
UP-0318	D001	4322528	1	D 1S2076ARE (RADIAL)
UP-0318	D002-D007	4320031	6	D 1S2076ATE
UP-0318	GA001	2100389	1	GA GAS ARRESTOR T08-800B
UP-0318	IC001	1251601	1	REG uPC78L05J (NJM78L05A)
UP-0318	IC002	1252494	1	REG uPC79L05J (NJM79L05A)
UP-0318	IC003	1300638	1	MIC CD4053BE(MC14053BCP)
UP-0318	IC004	1253519	1	REG LT1009CZ 2.5VREF
UP-0318	IC005-IC006	1253617	2	OPIC uPC4062C DUAL LOW POWER
UP-0318	IC007	1253279	1	OPIC LT1001CN8 LOW DRIFT
UP-0318	IC008	1204867	1	AIC HA17903PS COMPARATOR
UP-0318	IC009	1300611	1	MIC CD4051BE (MC14051BCP)
UP-0318	IC010	1300504	1	MIC HD14040BP (MC14040BCP)
UP-0318	IC011	1301049	1	MIC CD4094BE (MC14094BCP)
UP-0318	IC012	1300504	1	MIC HD14040BP (MC14040BCP)
UP-0318	IC013	1601946	1	MD EHD-HA1270 ISOLATE
UP-0318	PC001-PC002	0600307	2	TRP PC810A
UP-0318	Q001-Q003	4335069	3	TRC 2SC1213AKDTZ
UP-0318	R001	4303513	1	MR1 SN14C2CT26 10.0KOHM F
UP-0318	R002	4302826	1	MR1 SN14C2CT26 1.91KOHM F
UP-0318	R003	4304183	1	MR1 SN14C2CT26 49.9KOHM F
UP-0318	R004-R005	4302559	2	MR1 SN14C2CT26 1.00KOHM F
UP-0318	R006	4303513	1	MR1 SN14C2CT26 10.0KOHM F
UP-0318	R007	4302844	1	MR1 SN14C2CT26 2.00KOHM F

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-0318	R008	4303513	1	MR1 SN14C2CT26 10.0KOHM F
UP-0318	R009	4301301	1	MR1 SN14C2CT26 49.9 OHM F
UP-0318	R010	4304183	1	MR1 SN14C2CT26 49.9KOHM F
UP-0318	R011	4302265	1	MR1 SN14C2CT26 499 OHM F
UP-0318	R012	4304521	1	MR1 SN14C2CT26 113KOHM F
UP-0318	R013	4303807	1	MR1 SN14C2CT26 20.0KOHM F
UP-0318	R014	4304851	1	MR1 SN14C2CT26 249KOHM F
UP-0318	R015-R017	4304477	3	MR1 SN14C2CT26 100KOHM F
UP-0318	R018	4304263	1	MR1 SN14C2CT26 60.4KOHM F
UP-0318	R021	4302844	1	MR1 SN14C2CT26 2.00KOHM F
UP-0318	R022	4301596	1	MR1 SN14C2CT26 100 OHM F
UP-0318	R023	4304477	1	MR1 SN14C2CT26 100KOHM F
UP-0318	R024	4304085	1	MR1 SN14C2CT26 39.2KOHM F
UP-0318	R025	4302559	1	MR1 SN14C2CT26 1.00KOHM F
UP-0318	R026	4304646	1	MR1 SN14C2CT26 150KOHM F
UP-0318	R027	4304414	1	MR1 SN14C2CT26 86.6KOHM F
UP-0318	R028	4303807	1	MR1 SN14C2CT26 20.0KOHM F
UP-0318	R031	4304762	1	MR1 SN14C2CT26 200KOHM F
UP-0318	R032	4303799	1	MR1 SN14C2CT26 19.6KOHM F
UP-0318	R033	4304263	1	MR1 SN14C2CT26 60.4KOHM F
UP-0318	R034-R039	4304762	6	MR1 SN14C2CT26 200KOHM F
UP-0318	R040-R043	4304477	4	MR1 SN14C2CT26 100KOHM F
UP-0318	R044	4304094	1	MR1 SN14C2CT26 40.2KOHM F
UP-0318	R045	4303513	1	MR1 SN14C2CT26 10.0KOHM F
UP-0318	R046	4303807	1	MR1 SN14C2CT26 20.0KOHM F
UP-0318	R047-R049	4303513	3	MR1 SN14C2CT26 10.0KOHM F
UP-0318	R050	4304477	1	MR1 SN14C2CT26 100KOHM F
UP-0318	T001	3772365	1	PLTF T3772365 EP10PS
UP-0318	T002	3772356	1	PLTF T3772356 EP10IS
UP-0318	VR001	4160809	1	TPOT ET-6P(GF-06P RJ-6P) 2KOHM
UP-0318	VR002-VR003	4160596	2	TPOT ET-6P(GF-06P) 1KOHM
UP-0318	VR004	4160613	1	TPOT ET-6P(GF-06P) 10KOHM
UP-0318	VR005	4160596	1	TPOT ET-6P(GF-06P) 1KOHM

YZ-000P3 CO CATHETER CONNECTION CABLE

YZ-000P3		5300372	1	CCN1 HR16-18P-10P(01) Red
YZ-000P3		5305242	1	CCN1 206430-2
YZ-000P3		5390327	1	CCN 206062-1 AMP CRAMP
YZ-000P3		5415506	2	NCN 170252-1 AMP PIN

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
YZ-000P3		5553036	1	CORD THERMISTOR PROBE SP5030
YZ-000P3		5553045	1	CORD CATHETER CORD SP4035

UP-0319 TEMP HEAD AMP BOARD

UP-0319	CN001	5427877	1	PCN PCN10EA-20P-2.54DS(05)
UP-0319	CN002	5445349	1	CN JACK HLJ0527-01-030
UP-0319	CN003	5428234	1	PCN M60-04-30-114P
UP-0319	C001-C002	3810645	2	TC04 221M 16V10uF-M1
UP-0319	C003-C004	4317525	2	CEC1 TP D55Y5V1H 104Z 5-W
UP-0319	C006	4315162	1	FLC1 ECQ-B 1H 103JZ3 0.01uF
UP-0319	C007-C008	4315304	2	FLC1 ECQ-V 1H 104JZ3 (0.1uF)
UP-0319	C009	4317632	1	CEC2 DD05-989B 471K500 (470pF)
UP-0319	C010	4315046	1	FLC1 ECQ-B 1H 102JZ3 0.001uF
UP-0319	C011	4315304	1	FLC1 ECQ-V 1H 104JZ3 (0.1uF)
UP-0319	C014	4315162	1	FLC1 ECQ-B 1H 103JZ3 0.01uF
UP-0319	D001-D006	4322528	6	D 1S2076ARE (RADIAL)
UP-0319	GA001	2100389	1	GA GAS ARRESTOR T08-800B
UP-0319	IC001	1251601	1	REG uPC78L05J (NJM78L05A)
UP-0319	IC002	1252494	1	REG uPC79L05J (NJM79L05A)
UP-0319	IC003	1300638	1	MIC CD4053BE(MC14053BCP)
UP-0319	IC004	1253519	1	REG LT1009CZ 2.5VREF
UP-0319	IC005	1253617	1	OPIC uPC4062C DUAL LOW POWER
UP-0319	IC006	1253279	1	OPIC LT1001CN8 LOW DRIFT
UP-0319	IC007	1300611	1	MIC CD4051BE (MC14051BCP)
UP-0319	IC008	1300504	1	MIC HD14040BP (MC14040BCP)
UP-0319	IC009	1601946	1	MD EHD-HA1270 ISOLATE
UP-0319	PC001	0600307	1	TRP PC810A
UP-0319	Q001-Q002	4335069	2	TRC 2SC1213AKDTZ
UP-0319	R001	4303513	1	MR1 SN14C2CT26 10.0KOHM F
UP-0319	R002	4302933	1	MR1 SN14C2CT26 2.49KOHM F
UP-0319	R003	4304183	1	MR1 SN14C2CT26 49.9KOHM F
UP-0319	R004	4302559	1	MR1 SN14C2CT26 1.00KOHM F
UP-0319	R005	4302844	1	MR1 SN14C2CT26 2.00KOHM F
UP-0319	R006	4304183	1	MR1 SN14C2CT26 49.9KOHM F
UP-0319	R007	4302559	1	MR1 SN14C2CT26 1.00KOHM F
UP-0319	R008	4304031	1	MR1 SN14C2CT26 34.8KOHM F
UP-0319	R009	4303513	1	MR1 SN14C2CT26 10.0KOHM F
UP-0319	R010	4304477	1	MR1 SN14C2CT26 100KOHM F
UP-0319	R011-R012	4303513	2	MR1 SN14C2CT26 10.0KOHM F

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-0319	R013	4304067	1	MR1 SN14C2CT26 37.4KOHM F
UP-0319	R014	4303228	1	MR1 SN14C2CT26 4.99KOHM F
UP-0319	R015	4303807	1	MR1 SN14C2CT26 20.0KOHM F
UP-0319	R016	4302844	1	MR1 SN14C2CT26 2.00KOHM F
UP-0319	R017-R019	4007664	3	MR1 MFAAT1 1060 OHM
UP-0319	R020	4007673	1	MR1 MFAAT1 311.6 OHM
UP-0319	R021	4007682	1	MR1 MFAAT1 1753.4 OHM
UP-0319	R022-R023	4303513	2	MR1 SN14C2CT26 10.0KOHM F
UP-0319	T001	3772365	1	PLTF T3772365 EP10PS
UP-0319	T002	3772356	1	PLTF T3772356 EP10IS
UP-0319	VR001	4160809	1	TPOT ET-6P(GF-06P RJ-6P) 2KOHM
UP-0319	VR002	4160596	1	TPOT ET-6P(GF-06P) 1KOHM

CD-050PA AE-800PA HEAD AMPLIFIER CHASSIS PART

CD-050PA	CN003	5350371	1	CCN2 HR16-18R-10S(04) green

UP-0421 EEG MAIN BOARD

UP-0421	CN001	5427877	1	PCN PCN10EA-20P-2.54DS(05)
UP-0421	CN002	5427137	1	PCN HKP-14FDS2-7,8,9T
UP-0421	C001-C002	4312557	2	TC04 204M2002 106MB(10uF/20V)
UP-0421	C003-C004	4317525	2	CEC1 TP D55Y5V1H 104Z 5-W
UP-0421	C005-C006	4315162	2	FLC1 ECQ-B 1H 103JZ3 0.01uF
UP-0421	C007	4315304	1	FLC1 ECQ-V 1H 104JZ3 (0.1uF)
UP-0421	C008-C016	4315046	9	FLC1 ECQ-B 1H 102JZ3 0.001uF
UP-0421	C017	4315206	1	FLC1 ECQ-B 1H 223JZ3 0.022uF
UP-0421	C018-C019	4312557	2	TC04 204M2002 106MB(10uF/20V)
UP-0421	D001-D010	4322528	10	D 1S2076ARE
UP-0421	D030-D039	4320013	10	D 1SS104,TP3
UP-0421	GA001	2100389	1	GA Gas Arrestor T08-800B
UP-0421	IC001	1251601	1	REG uPC78L05J (NJM78L05A)
UP-0421	IC002	1252494	1	REG uPC79L05J (NJM79L05A)
UP-0421	IC003	1300638	1	MIC HD14053BP(MC14053BCP)
UP-0421	IC004	1300504	1	MIC HD14040BP (MC14040BCP)
UP-0421	IC005	1601946	1	MD EHD-HA1270 ISOLATE
UP-0421	IC006	1253617	1	OPIC uPC4062C DUAL Low Power
UP-0421	IC007-IC008	1253715	2	OPIC uPC812C(LF412CN)2FET
UP-0421	PC001-PC002	0600307	2	TRP PC810A

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-0421	Q001-Q003	4335069	3	TRC 2SC1213AKDTZ
UP-0421	T001	3772365	1	PLTF T3772365 EP10PS
UP-0421	T002	3772356	1	PLTF T3772356 EP10IS
UP-0421	VR001	4160604	1	TPOT GF06P 5KOHM

UP-0422 EEG SUB BOARD

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-0422	CN050	5427003	1	PCN HKP-14M5S-7,8,9T RECEPTACLE MALE
UP-0422	C050-C057	4312557	8	TC04 204M2002 106MB(10uF/20V)
UP-0422	C058-C059	4315144	2	FLC1 ECQ-B 1H 682JZ3 0.0068uF
UP-0422	C060-C061	4315126	2	FLC1 ECQ-B 1H 472JZ3 0.0047uF
UP-0422	C062-C063	4315206	2	FLC1 ECQ-B 1H 223JZ3 0.022uF
UP-0422	C064-C065	4315135	2	FLC1 ECQ-B 1H 562JZ3 0.0056uF
UP-0422	C066-C071	4315269	6	FLC1 ECQ-V 1H 473JZ3 (0.047uF)
UP-0422	C072-C073	4312557	2	TC04 204M2002 106MB(10uF/20V)
UP-0422	C074-C075	4317525	2	CEC1 TP D55Y5V1H 104Z 5-W
UP-0422	D050-D053	4322528	4	D 1S2076ARE
UP-0422	IC050	1253715	1	OPIC uPC812C(LF412CN)2FET
UP-0422	IC051-IC054	1253279	4	OPIC LT1001CN8 LOW DRIFT
UP-0422	IC055-IC056	1253617	2	OPIC uPC4062C DUAL Low Power
UP-0422	VR050-VR051	4160925	2	TPOT GF-06S(ET-6S) 20KOHM
UP-0422	VR054-VR055	4160934	2	TPOT GF-06S(ET-6S)500 OHM

UP-0548 AR-800PA RESP HEAD AMPLIFIER BOARD

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-0548	CN001	5427877	1	PCN PCN10EA-20P-2.54DS(05)
UP-0548	CN002	5430721	1	CN LGY 6501-0101
UP-0548	CN003	5428234	1	PCN M60-04-30-114P
UP-0548	C001-C002	4312557	2	TC04 204M2002 106MB(10uF/20V)
UP-0548	C003-C004	4312735	2	TC04 204M3502 105MB (1uF/35V)
UP-0548	C005	4312557	1	TC04 204M2002 106MB(10uF/20V)
UP-0548	C006	4315385	1	FLC1 ECQ-V 1H 474JZ3 (0.47uF)
UP-0548	C007	4315242	1	FLC1 ECQ-V 1H 333JZ3 (0.033uF)
UP-0548	C008	3834031	1	MPC DH4M2A105K 100V1uF
UP-0548	C009	4315304	1	FLC1 ECQ-V 1H 104JZ3 (0.1uF)
UP-0548	C010	4315242	1	FLC1 ECQ-V 1H 333JZ3 (0.033uF)
UP-0548	C011-C012	4315162	2	FLC1 ECQ-B 1H 103JZ3 0.01uF
UP-0548	D001-D006	4322528	6	D 1S2076ARE
UP-0548	D007-D008	4322519	2	D 1SS104,TPB2
UP-0548	GA001	2100389	1	GA Gas Arrestor T08-800B

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-0548	IC001	1251601	1	REG uPC78L05J (NJM78L05A)
UP-0548	IC002	1252494	1	REG uPC79L05J (NJM79L05A)
UP-0548	IC003	1253519	1	REG LT1009CZ 2.5VREF
UP-0548	IC004	1601946	1	MD EHD-HA1270 ISOLATE
UP-0548	IC005	1253698	1	OPIC uPC 811C (LF 411CN)
UP-0548	IC006	1253715	1	OPIC uPC812C(LF412CN)2FET
UP-0548	IC007	1253617	1	OPIC uPC4062C DUAL Low Power
UP-0548	IC008	1300638	1	MIC HD14053BP(MC14053BCP)
UP-0548	PC001	0600307	1	TRP PC810A
UP-0548	Q001-Q002	4335069	2	TRC 2SC1213AKDTZ
UP-0548	T001	3772365	1	PLTF T3772365 EP10PS
UP-0548	T002	3772356	1	PLTF T3772356 EP10IS
UP-0548	VR001	4160613	1	TPOT GF06P 10KOHM

CD-062PA Sa02 HEAD AMPLIFIER CHASSIS PART

CD-062PA		5350389	1	CCN2 HR16-18R-10S(05) Blue

UP-0551 Sa02 MAIN BOARD

UP-0551	CN001	5427877	1	PCN PCN10EA-20P-2.54DS(05)
UP-0551	CN003	5427101	1	PCN HKP-18FDS2-7,8,9T Receptacle
UP-0551	C001-C002	4312557	2	TC04 204M2002 106MB(10uF/20V)
UP-0551	C003-C004	4317525	2	CEC1 TP D55Y5V1H 104Z 5-W
UP-0551	C005	4315126	1	FLC1 ECQ-B 1H 472JZ3 0.0047uF
UP-0551	C006	4315162	1	FLC1 ECQ-B 1H 103JZ3 0.01uF
UP-0551	C007	4317525	1	CEC1 TP D55Y5V1H 104Z 5-W
UP-0551	C008	4317561	1	CEC2 DD05-989SL 330K500 (33pF)
UP-0551	C009	4315304	1	FLC1 ECQ-V 1H 104JZ3 (0.1uF)
UP-0551	C010	4317534	1	CEC2 DD05-989SL 100D500 (10pF)
UP-0551	C011	4310042	1	EC04 ECEA1CU 101B (100uF/16V)
UP-0551	C012-C014	4317525	3	CEC1 TP D55Y5V1H 104Z 5-W
UP-0551	C015	4315046	1	FLC1 ECQ-B 1H 102JZ3 0.001uF
UP-0551	D001-D009	4322528	9	D 1S2076ARE
UP-0551	GA001	2100389	1	GA Gas Arrestor T08-800B
UP-0551	IC001	1251601	1	REG uPC78L05J (NJM78L05A)
UP-0551	IC002	1252494	1	REG uPC79L05J (NJM79L05A)
UP-0551	IC003	1300638	1	MIC HD14053BP(MC14053BCP)
UP-0551	IC004	1253519	1	REG LT1009CZ 2.5VREF
UP-0551	IC005	1601946	1	MD EHD-HA1270 ISOLATE

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-0551	IC006	1300611	1	MIC HD14051BP(MC14051BCP)
UP-0551	IC007	1300504	1	MIC HD14040BP (MC14040BCP)
UP-0551	IC008	1300629	1	MIC HD14052BP(MC14052BCP)
UP-0551	IC009	1253715	1	OPIC uPC812C(LF412CN)2FET
UP-0551	IC010	1253617	1	OPIC uPC4062C DUAL Low Power
UP-0551	IC011	1253715	1	OPIC uPC812C(LF412CN)2FET
UP-0551	PC001	0600307	1	TRP PC810A
UP-0551	Q001-Q004	4335069	4	TRC 2SC1213AKDTZ
UP-0551	T001	3772365	1	PLTF T3772365 EP10PS
UP-0551	T002	3772356	1	PLTF T3772356 EP10IS

UP-0552 Sa02 SUB BOARD

UP-0552	CN050	5427146	1	PCN HKP-18M5S-7,8,9T Receptacle Male
UP-0552	C050-C051	4317525	2	CEC1 TP D55Y5V1H 104Z 5-W
UP-0552	C052-C055	4315304	4	FLC1 ECQ-V 1H 104JZ3 (0.1uF)
UP-0552	C056	4315206	1	FLC1 ECQ-B 1H 223JZ3 0.022uF
UP-0552	C057-C059	4315304	3	FLC1 ECQ-V 1H 104JZ3 (0.1uF)
UP-0552	C061-C065	4312557	5	TC04 204M2002 106MB(10uF/20V)
UP-0552	C066-C067	4315242	2	FLC1 ECQ-V 1H 333JZ3 (0.033uF)
UP-0552	D050-D054	4322519	5	D 1SS104,TPB2
UP-0552	IC050	1300504	1	MIC HD14040BP (MC14040BCP)
UP-0552	IC051	1300629	1	MIC HD14052BP(MC14052BCP)
UP-0552	IC052	1300112	1	MIC MC14001UBCP (CD4001UBE)
UP-0552	IC053	1300611	1	MIC HD14051BP(MC14051BCP)
UP-0552	IC054	1300763	1	MIC HD14066BP (MC14066BCP)
UP-0552	IC055	1204894	1	AIC HA17901P Comparator
UP-0552	IC056	1253617	1	OPIC uPC4062C DUAL Low Power
UP-0552	IC058-IC060	1253715	3	OPIC uPC812C(LF412CN)2FET
UP-0552	Q050	4335069	1	TRC 2SC1213AKDTZ
UP-0552	VR051	4160925	1	TPOT GF-06S(ET-6S) 20KOHM
UP-0552	VR052-VR053	4160961	2	TPOT GF-06S(ET-6S) 5KOHM

AG-800PA C02 HEAD AMPLIFIER CHASSIS PART

AG-800PA	CN003	5350487	1	CCN2 HR16-18R-15S(07) brown

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION

UP-0588 C02 MAIN BOARD

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-0588	CN001	5427877	1	PCN PCN10EA-20P-2.54DS(05)
UP-0588	CN002	5427137	1	PCN HKP-14FDS2-7,8,9T FEMALE
UP-0588	C001-C002	4312557	2	TC04 204M2002 106MB(10uF/20V)
UP-0588	C003-C007	4317525	5	CEC1 TP D55Y5V1H 104Z 5-W
UP-0588	C008	4312735	1	TC04 204M3502 105MB (1uF/35V)
UP-0588	C009	4317525	1	CEC1 TP D55Y5V1H 104Z 5-W
UP-0588	C010-C011	4315162	2	FLC1 ECQ-B 1H 103JZ3 0.01uF
UP-0588	C012	4315046	1	FLC1 ECQ-B 1H 102JZ3 0.001uF
UP-0588	C013	4315304	1	FLC1 ECQ-V 1H 104JZ3 (0.1uF)
UP-0588	C014	4312735	1	TC04 204M3502 105MB (1uF/35V)
UP-0588	D001-D004	4322528	4	D 1S2076ARE
UP-0588	IC001	1301049	1	MIC CD4094BE (MC14094BCP)
UP-0588	IC002	1251174	1	ADIC uPC624C (DAC-08CQ)
UP-0588	IC003	1301601	1	MIC HD14538BP (MC14538BCP)
UP-0588	IC004-IC005	1300504	2	MIC HD14040BP (MC14040BCP)
UP-0588	IC006	1253519	1	REG LT1009CZ 2.5VREF
UP-0588	IC007	1253715	1	OPIC uPC812C(LF412CN)2FET
UP-0588	IC008-IC010	1253617	3	OPIC uPC4062C DUAL
UP-0588	Q001	4330011	1	TRA 2SA836 CorD TZ
UP-0588	T001	3790354	1	T DC-DC converter KDC-3826
UP-0588	VR001	4160961	1	TPOT GF-06S(ET-6S) 5KOHM

UP-0589 C02 SUB BOARD

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-0589	CN050	5427003	1	PCN HKP-14M5S-7,8,9T receptacle male
UP-0589	C050-C052	4317525	3	CEC1 TP D55Y5V1H 104Z 5-W
UP-0589	C053	4315385	1	FLC1 ECQ-V 1H 474JZ3 (0.47uF)
UP-0589	C054	4315046	1	FLC1 ECQ-B 1H 102JZ3 0.001uF
UP-0589	C055-C056	4315304	2	FLC1 ECQ-V 1H 104JZ3 (0.1uF)
UP-0589	C057	4315162	1	FLC1 ECQ-B 1H 103JZ3 0.01uF
UP-0589	C058	4315126	1	FLC1 ECQ-B 1H 472JZ3 0.0047uF
UP-0589	C059-C063	4315304	5	FLC1 ECQ-V 1H 104JZ3 (0.1uF)
UP-0589	C064	4312735	1	TC04 204M3502 105MB (1uF/35V)
UP-0589	D050	4322528	1	D 1S2076ARE
UP-0589	D051	4322519	1	D 1SS104,TPB2
UP-0589	D052	4322528	1	D 1S2076ARE
UP-0589	IC050-IC051	1253617	2	OPIC uPC4062C DUAL
UP-0589	IC052	1301601	1	MIC HD14538BP (MC14538BCP)
UP-0589	IC053	1300237	1	MIC MC14013BCP (CD4013BE)

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-0589	IC054	1302298	1	MIC HD14001BP(MC14001BCP)
UP-0589	IC055	1300638	1	MIC HD14053BP(MC14053BCP)
UP-0589	IC056	1300763	1	MIC HD14066BP (MC14066BCP)
UP-0589	IC057	1300611	1	MIC HD14051BP(MC14051BCP)
UP-0589	IC058-IC061	1253715	4	OPIC uPC812C(LF412CN)2FET
UP-0589	IC062	1204867	1	AIC HA17903PS comparator
UP-0589	IC063	1253617	1	OPIC uPC4062C DUAL

AG-820PA 02 HEAD AMPLIFIER CHASSIS PART

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
AG-820PA	CN002	5350291	1	CCN2 HR16-13R-5S(04) green

UP-0592 02 HEAD AMPLIFIER BOARD

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-0592	CN001	5427877	1	PCN PCN10EA-20P-2.54DS(05)
UP-0592	CN003	5428234	1	PCN M60-04-30-114P
UP-0592	C001-C002	4312557	2	TC04 204M2002 106MB(10uF/20V)
UP-0592	C003-C004	4317525	2	CEC1 TP D55Y5V1H 104Z 5-W
UP-0592	C005	4315162	1	FLC1 ECQ-B 1H 103JZ3 0.01uF
UP-0592	C006	4317525	1	CEC1 TP D55Y5V1H 104Z 5-W
UP-0592	C007	4315162	1	FLC1 ECQ-B 1H 103JZ3 0.01uF
UP-0592	C008	4317525	1	CEC1 TP D55Y5V1H 104Z 5-W
UP-0592	C009	4317632	1	CEC2 DD05-989B 471K500 (470pF)
UP-0592	C010-C011	4315162	2	FLC1 ECQ-B 1H 103JZ3 0.01uF
UP-0592	D001-D006	4322528	6	D 1S2076ARE
UP-0592	D007-D012	4322519	6	D 1SS104,TPB2
UP-0592	GA001	2100424	1	GA Y08-2100B
UP-0592	IC001	1251601	1	REG uPC78L05J (NJM78L05A)
UP-0592	IC002	1252494	1	REG uPC79L05J (NJM79L05A)
UP-0592	IC003	1300638	1	MIC HD14053BP(MC14053BCP)
UP-0592	IC004	1601946	1	MD EHD-HA1270 ISOLATE
UP-0592	IC005	1253519	1	REG LT1009CZ 2.5VREF
UP-0592	IC006	1300504	1	MIC HD14040BP (MC14040BCP)
UP-0592	IC007	1300611	1	MIC HD14051BP(MC14051BCP)
UP-0592	IC008	1253715	1	OPIC uPC812C(LF412CN)2FET
UP-0592	IC009-IC010	1253279	2	OPIC LT1001CN8 LOW DRIFT
UP-0592	Q001-Q002	4335069	2	TRC 2SC1213AKDTZ
UP-0592	T001	3772365	1	PLTF T3772365 EP10PS
UP-0592	T002	3772356	1	PLTF T3772356 EP10IS
UP-0592	VR001-VR002	4160809	2	TPOT GF06P 2KOHM

Section 10

10. Circuit diagrams

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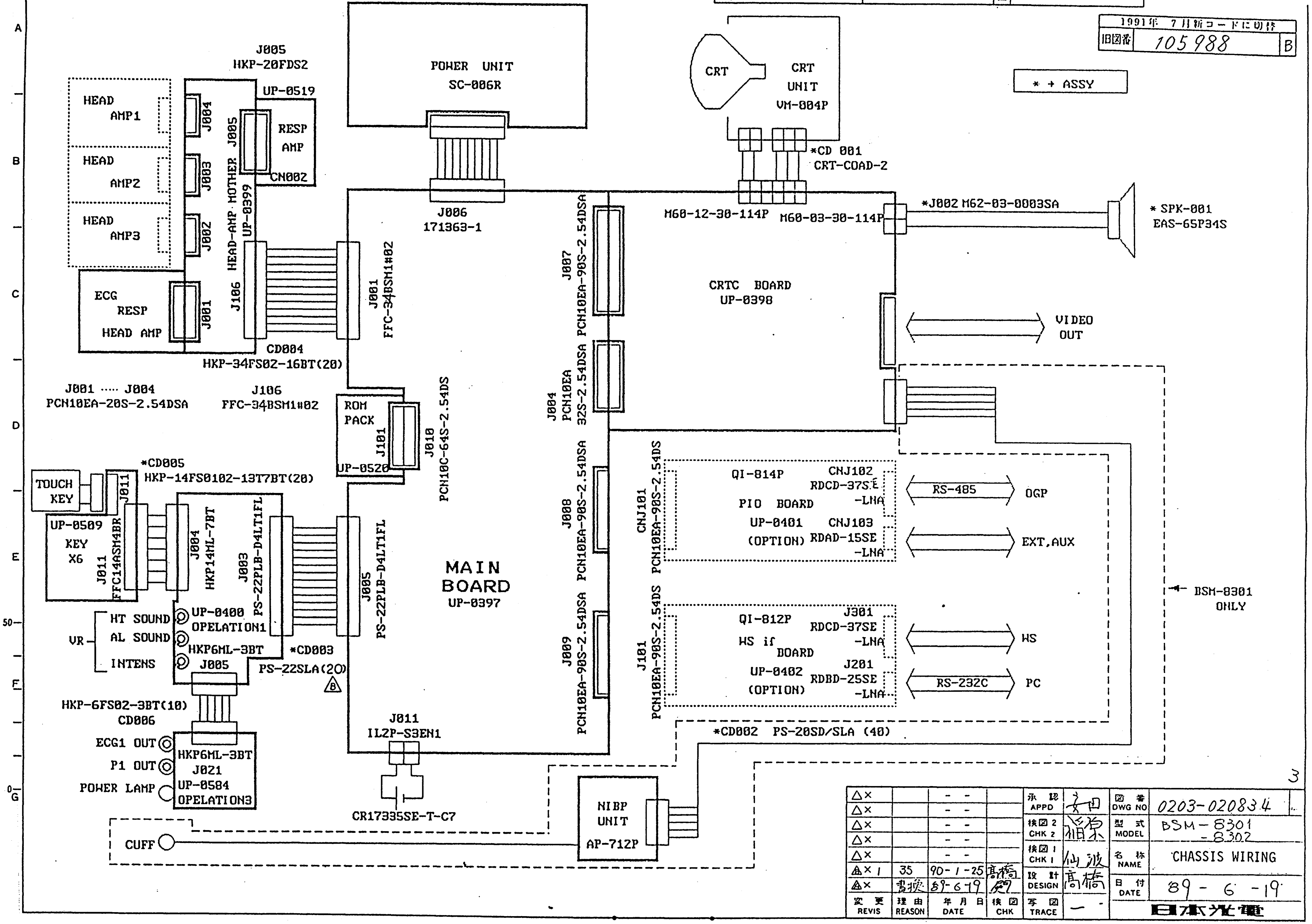
1991年 7月新コードに切替

旧図番 105988 B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HEAD
AMP2
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AMP3
ECG
RESP
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J002
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HEAD-AMP MOTHER J005
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3

変更 REVIS	理由 REASON	年月日 DATE	検図 CHK				
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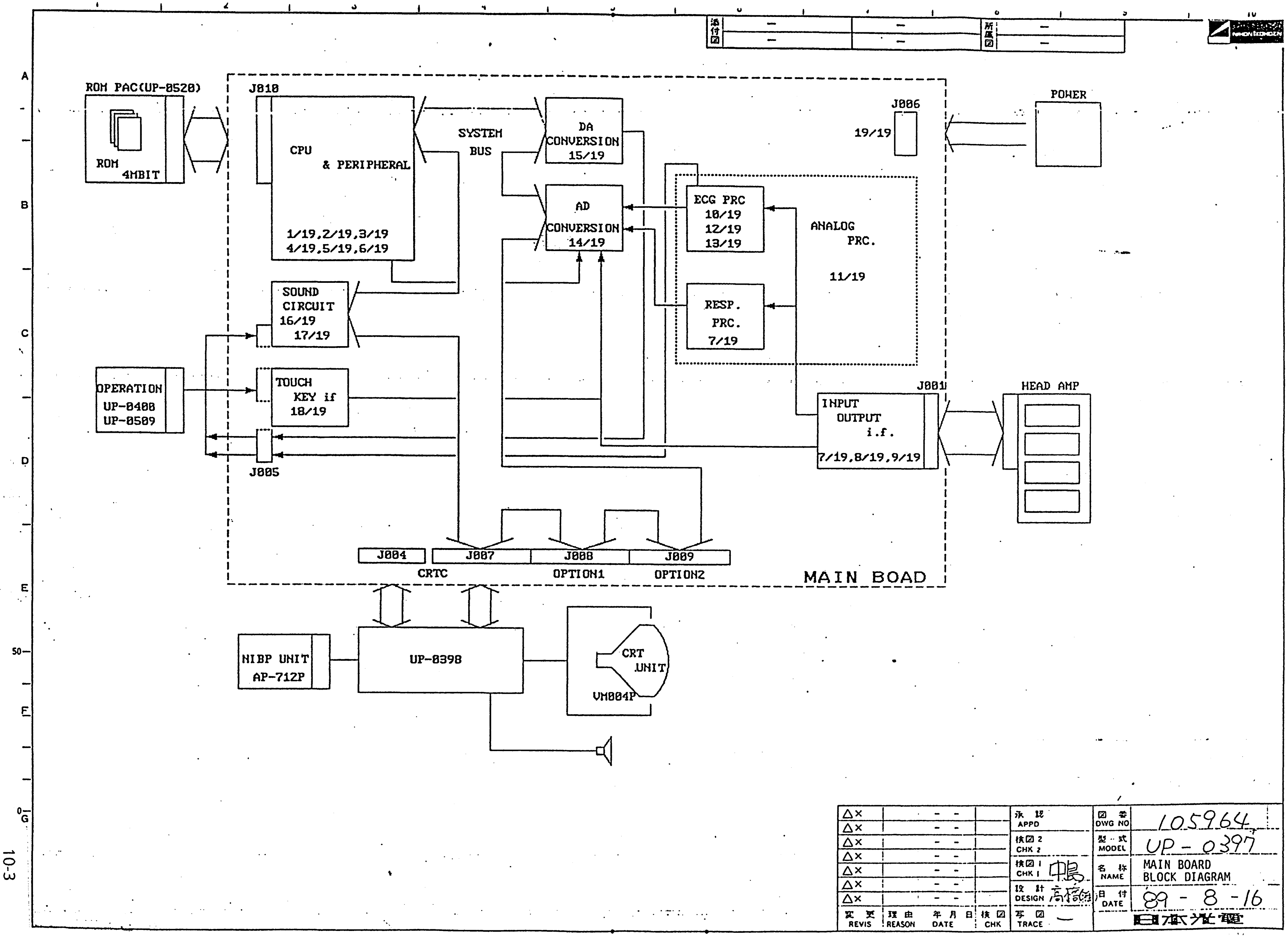
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13/19
ANALOG
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11/19
RESP.
PRC.
7/19
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17/19
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図番 DWG NO 105964

型式 MODEL UP-0397

名称 NAME MAIN BOARD BLOCK DIAGRAM

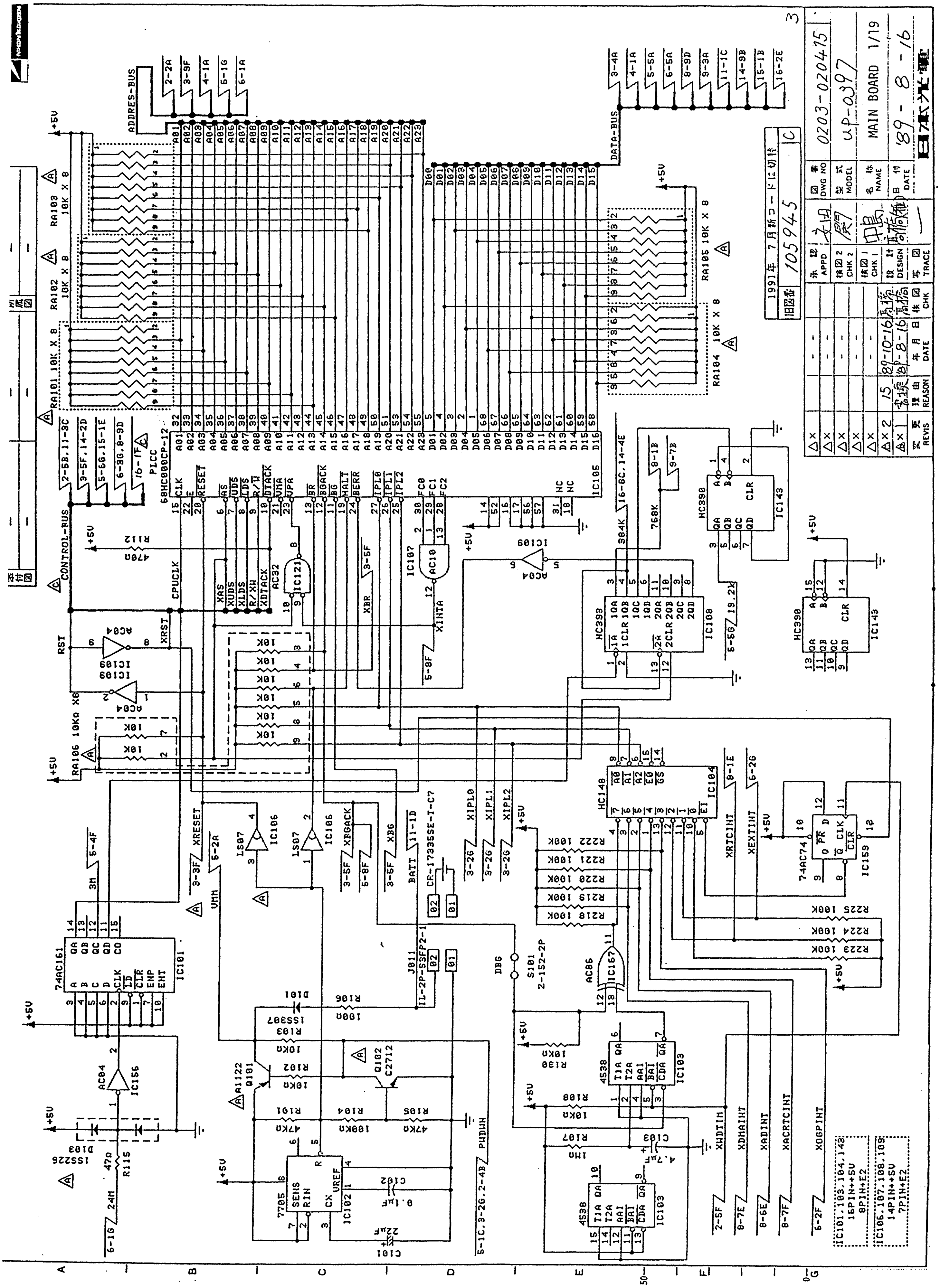
日付 DATE 89-8-16

検図1 CHK 1 中島

設計 DESIGN 高橋

写図 TRACE —

日本光電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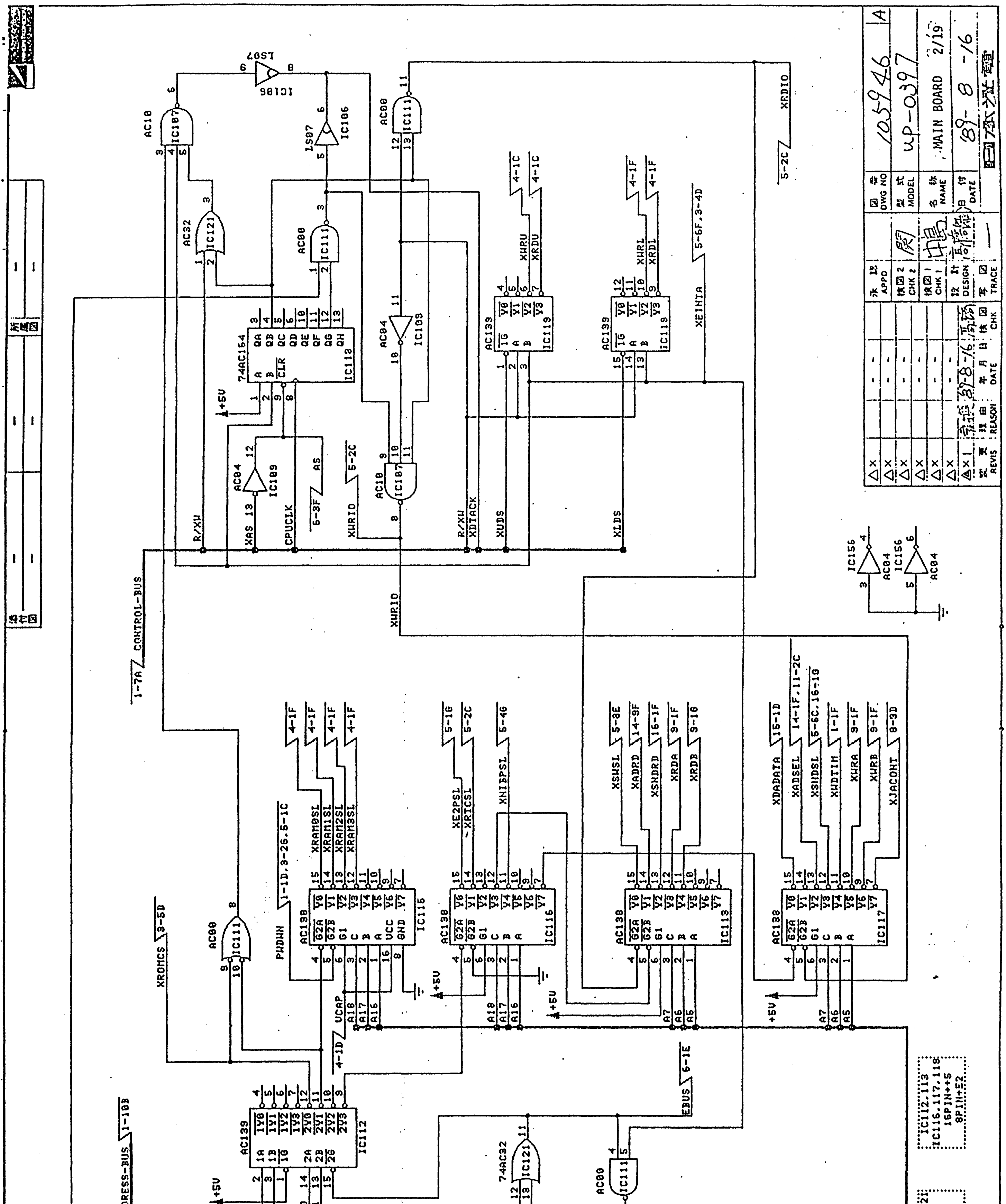
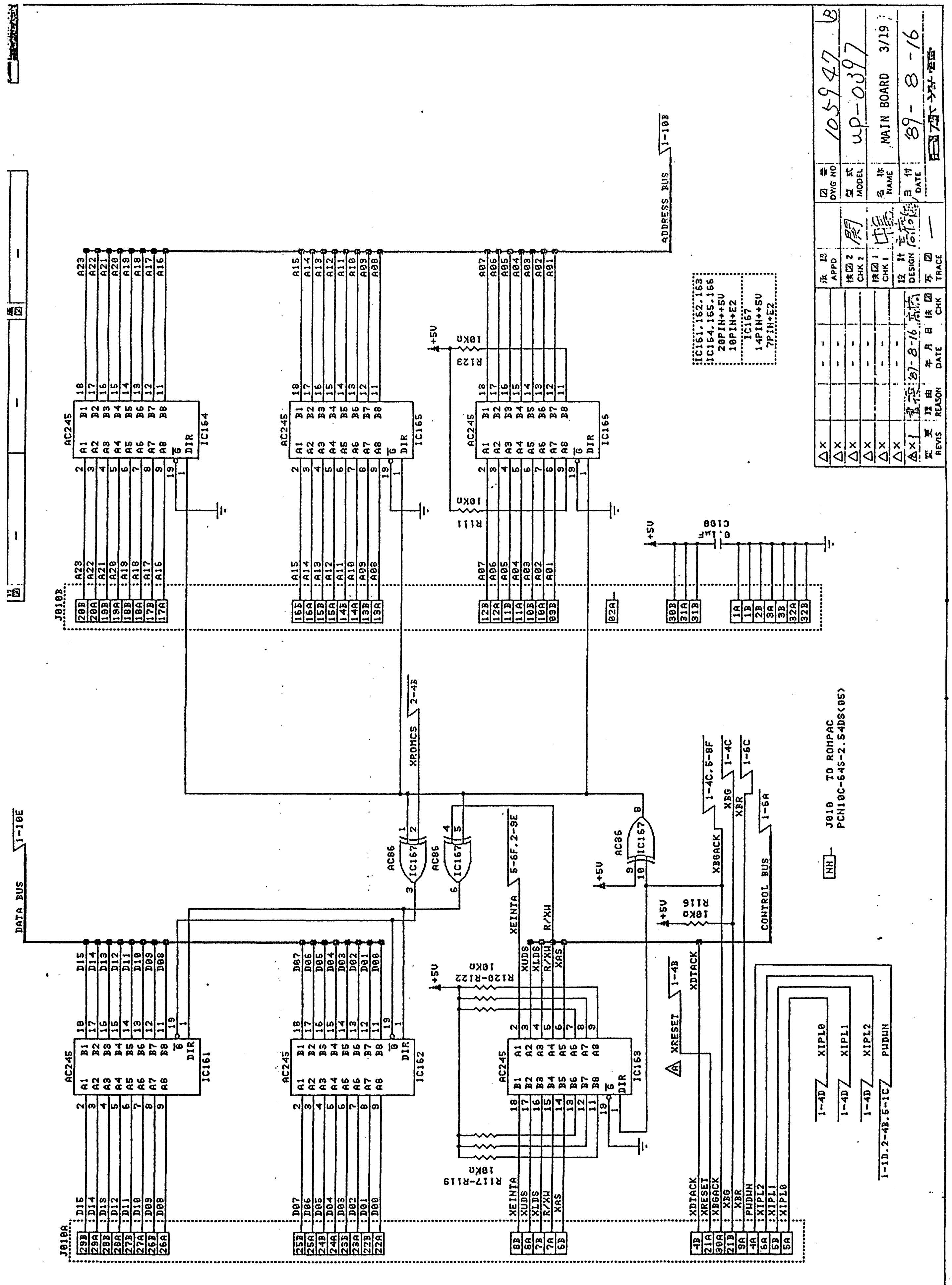
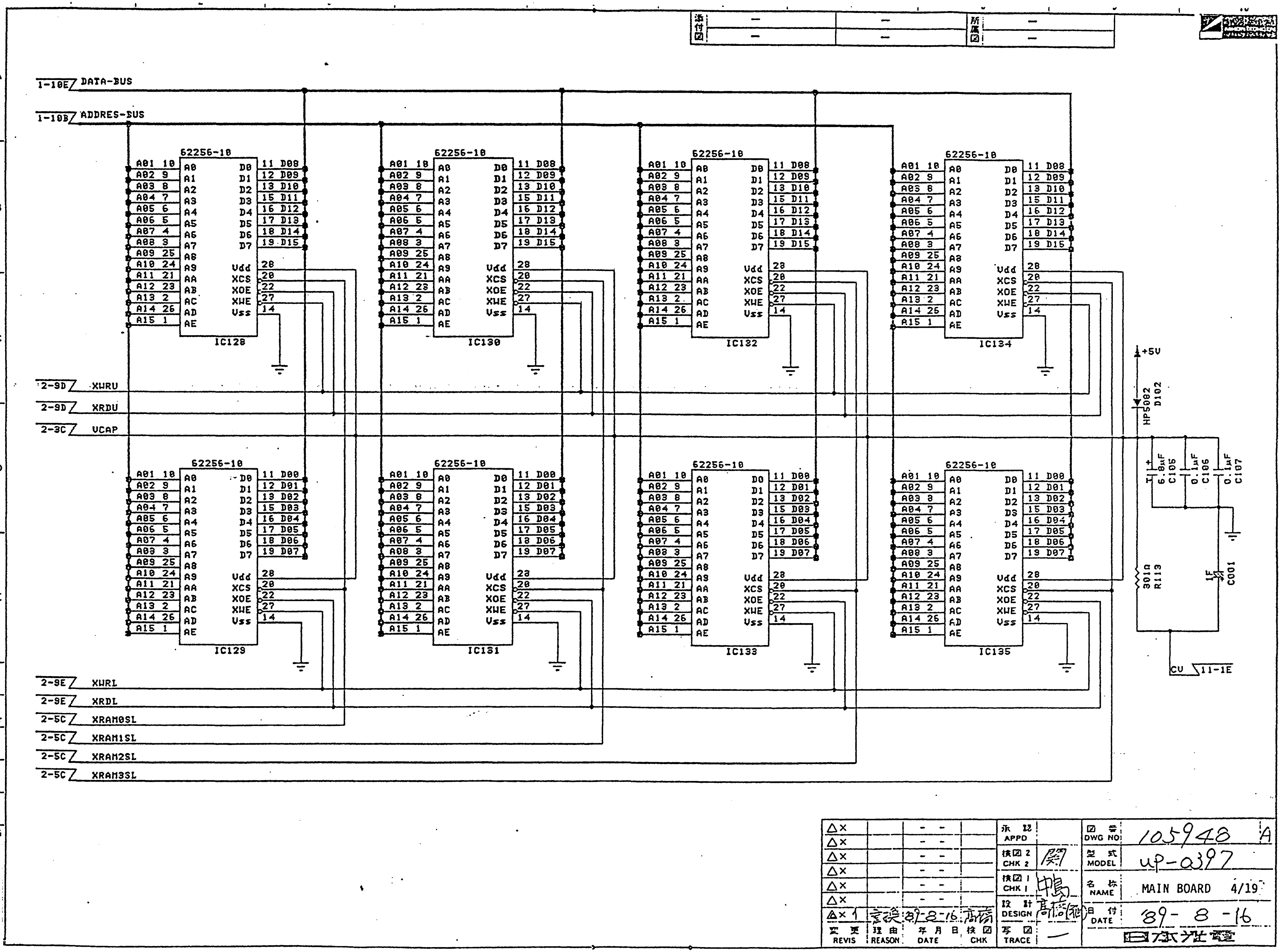
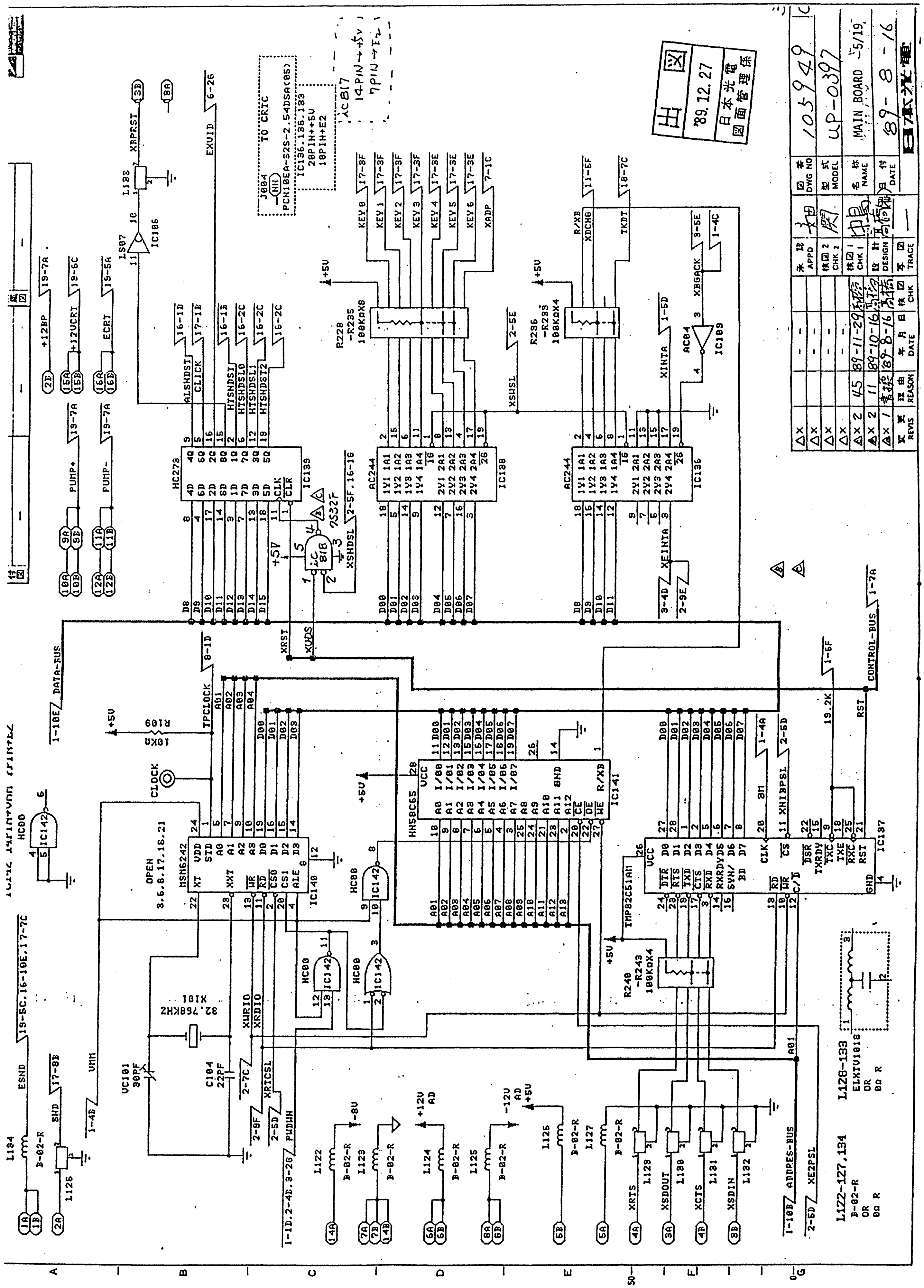
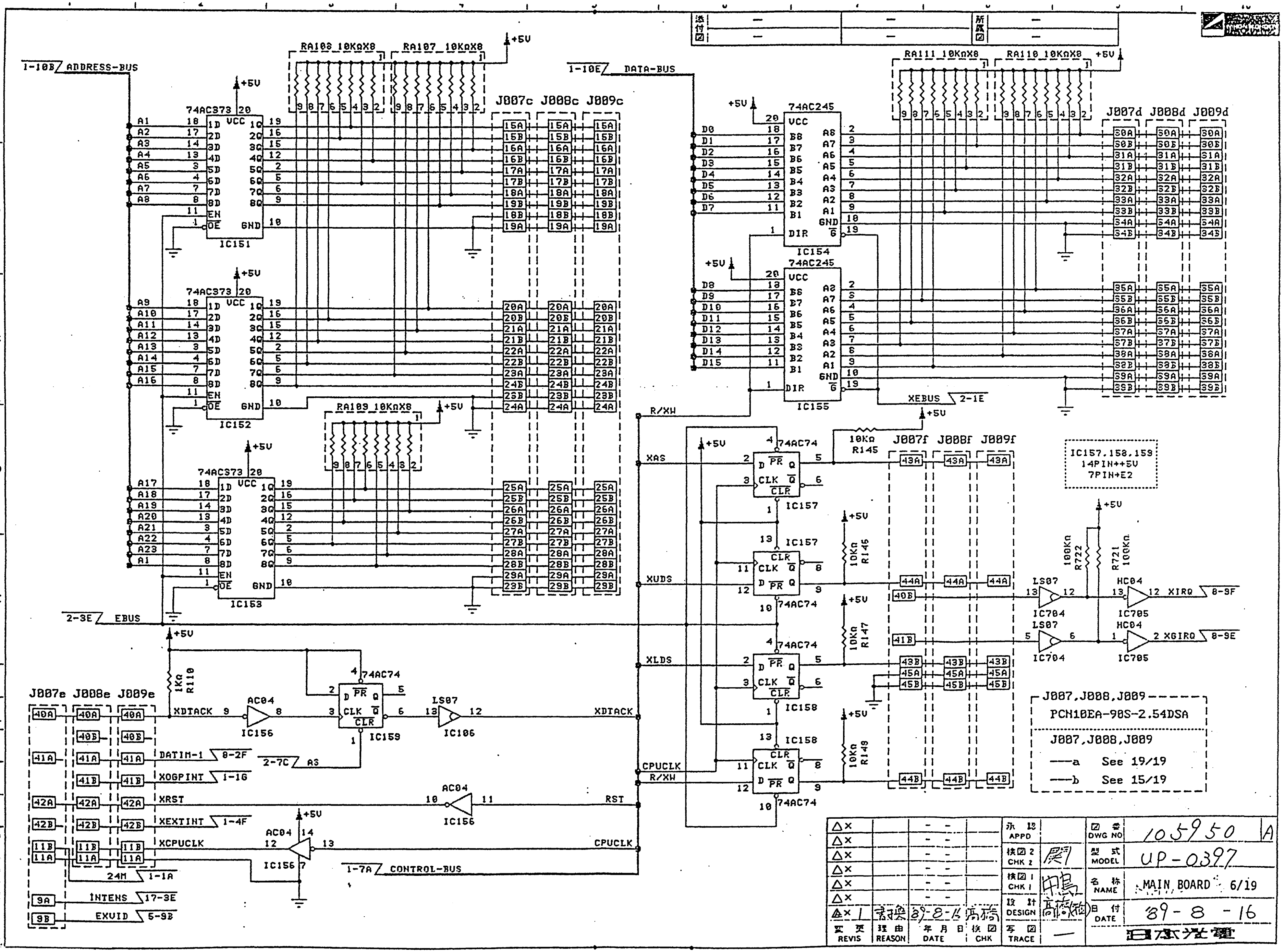
R219 100K
R218 100K
R225 100K
R224 100K
R223 100K
XIPL0
XIPL1
XIPL2
3-26
LS07
IC106
XRESET
VMM
5-2A
3-3F
XBGACK
XBG
3-5F
5-8F
BATT
11-1D
CR-17335E-T-C7
J011
IL-2P-S5FP2-1
DB6
S101
Z-152-2P
AC86
IC167
74AC161
IC101
3M
5-4F
AC04
IC156
D103
1SS226
R115 47Ω
24M
6-1G
D101
1SS307
R106 100Ω
R103 10KΩ
R102 10KΩ
Q101 A1122
Q102 C2712
R101 47KΩ
R104 100KΩ
R105 47KΩ
PWDWN
7705
IC102
SENS
RIN
CX
VREF
C102 0.1μF
C101 22μF
5-1C,3-2G,2-4B
4538
IC103
T1A
T2A
AAI
BAI
CDA
QA
R130 10KΩ
R108 10KΩ
R107 1MΩ
C103 4.7μF
XWDTIM
XDMAINT
XADINT
XACRTCINT
XOGPINT
2-5F
8-7E
8-6E
8-7F
6-2F
IC101,103,104,143
16PIN+5V
8PIN+E2
IC106,107,108,109
14PIN+5V
7PIN+E2
+5V
3
1991年 7月新コードに切替
旧図番 105945
C
図番 DWG NO 0203-020415
型式 MODEL UP-0397
名称 NAME MAIN BOARD 1/19
日付 DATE '89-8-16
承認 APPD
検図2 CHK 2
検図1 CHK 1
設計 DESIGN
写図 TRACE
変更 REVIS
理由 REASON
年月日 DATE
検図 CHK
15
89-10-16
89-8-16
日本光電


105946 A
UP-0397
MAIN BOARD 2/19
89-8-16
CONTROL-BUS
ADDRESS-BUS
EBUS
XEBUS
R/XW
XAS
CPUCLK
XWRIO
XRDIO
XDTACK
XUDS
XLDS
XWRU
XRDU
XWRL
XRDL
XEINTA
XROMCS
PWDWN
XRAM0SL
XRAM1SL
XRAM2SL
XRAM3SL
XE2PSL
~XRTCSL
XNIBPSL
XSWSL
XADRD
XSNDRD
XRDA
XRDB
XDADATA
XADSEL
XSNDSL
XWDTIM
XWRA
XWRB
XJACONT
74AC164
AC139
AC138
AC08
AC32
AC04
LS07
74AC32
IC106
IC107
IC109
IC111
IC112
IC113
IC115
IC116
IC117
IC118
IC119
IC121
IC156
IC111.118.121 14PIN→+5 7PIN→E2
IC112.113 IC116.117.119 16PIN→+5 8PIN→E2

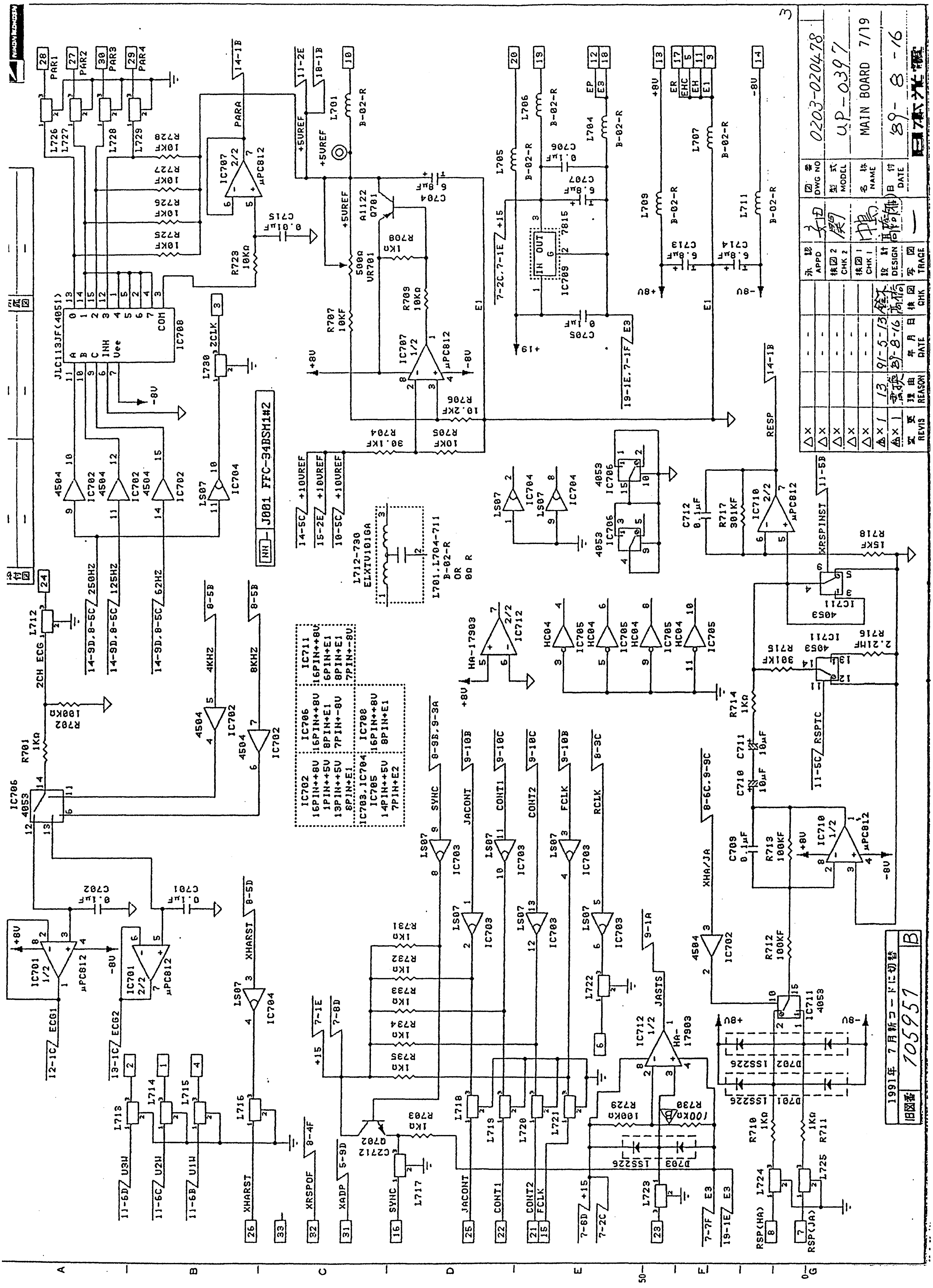

DATA BUS
1-10E
ADDRESS BUS
1-10B
CONTROL BUS
AC245
IC161
IC162
IC163
IC164
IC165
IC166
AC86
IC167
J010A
J010B
J010 TO ROMPAC
PCN10C-64S-2.54DS(05)
IC161,162,163
IC164,165,166
20PIN→+5V
10PIN→E2
IC167
14PIN→+5V
7PIN→E2
XROMCS
2-4B
XEINTA
5-6F,2-9E
R/XW
XUDS
XLDS
XAS
XDTACK
XRESET
XBGACK
XBG
XBR
XPIL0
XIPL1
XIPL2
PWDWN
1-4B
1-4C,5-8F
1-4C
1-6C
1-6A
1-4D
1-1D,2-4B,5-1C
R111 10KΩ
R123 10KΩ
R116 10KΩ
R117-R119 10KΩ
R120-R122 10KΩ
C108
+5V
DVG NO 105947 B
MODEL up-0397
NAME MAIN BOARD 3/19
DATE 89-8-16
APPD
CHK 2
CHK 1
DESIGN
TRACE
REVIS REASON DATE CHK
A B C D E F G

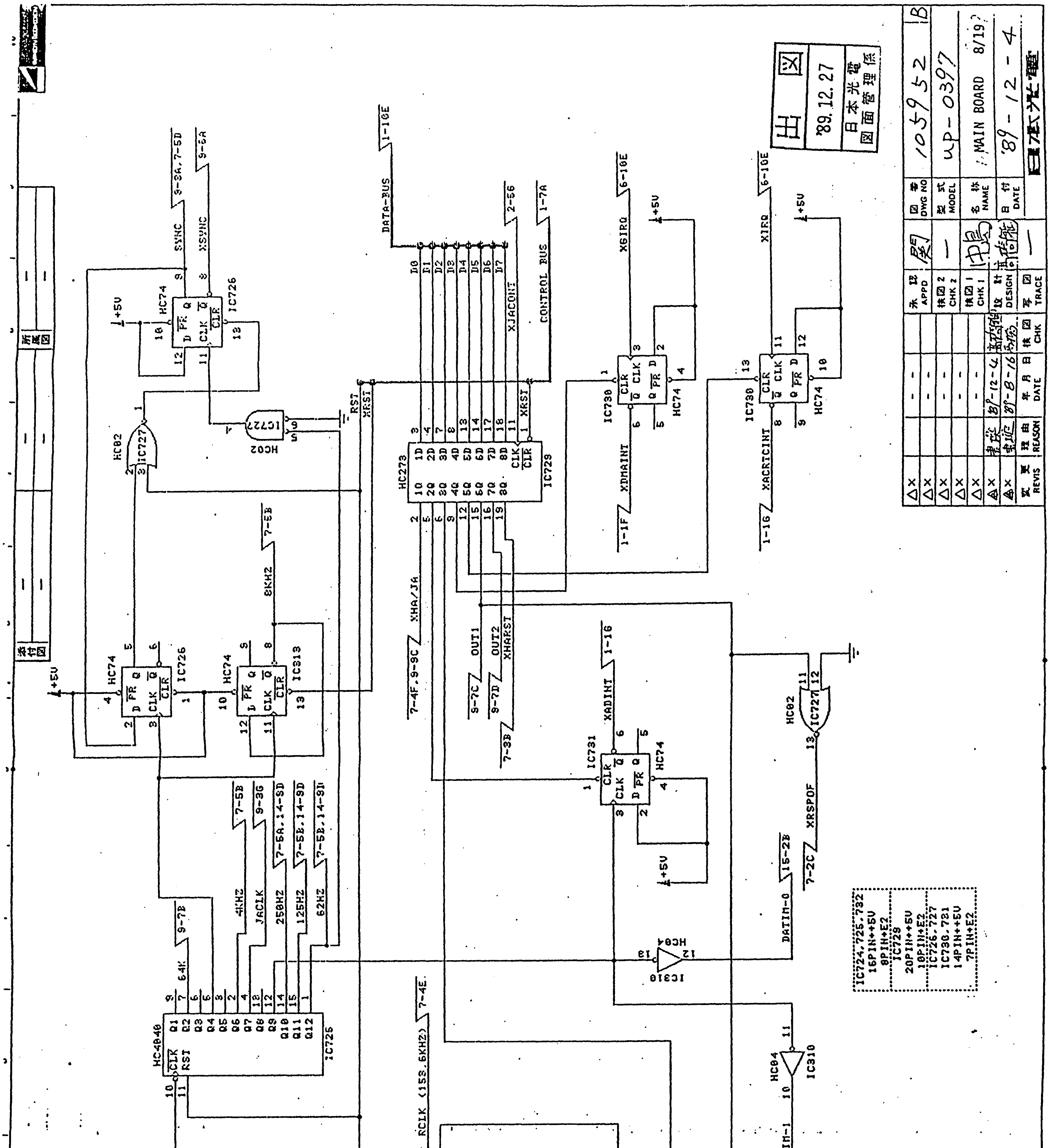

1-10E DATA-BUS
1-10B ADDRES-BUS
62256-10
IC128
IC129
IC130
IC131
IC132
IC133
IC134
IC135
A01 10
A02 9
A03 8
A04 7
A05 6
A06 5
A07 4
A08 3
A09 25
A10 24
A11 21
A12 23
A13 2
A14 26
A15 1
A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 AA AB AC AD AE
D0 D1 D2 D3 D4 D5 D6 D7
Vdd XCS XOE XWE Vss
11 D08
12 D09
13 D10
15 D11
16 D12
17 D13
18 D14
19 D15
11 D00
12 D01
13 D02
15 D03
16 D04
17 D05
18 D06
19 D07
28 20 22 27 14
2-9D XWRU
2-9D XRDU
2-3C VCAP
2-9E XWRL
2-9E XRDL
2-5C XRAM0SL
2-5C XRAM1SL
2-5C XRAM2SL
2-5C XRAM3SL
+5V
HP5082
D102
6.8μF
C105
0.1μF
C106
0.1μF
C107
301Ω
R113
1F
C001
CU 11-1E
A
B
C
D
E
50
F
0
G
添付図
所属図
承認 APPD
検図2 CHK 2
関
検図1 CHK 1
中島
設計 DESIGN
高橋
写図 TRACE
図番 DWG NO
105948 A
型式 MODEL
UP-0397
名称 NAME
MAIN BOARD 4/19
日付 DATE
89-8-16
△×
△×1 誤記 89-8-16 高橋
変更 REVIS
理由 REASON
年月日 DATE
検図 CHK
日本光電

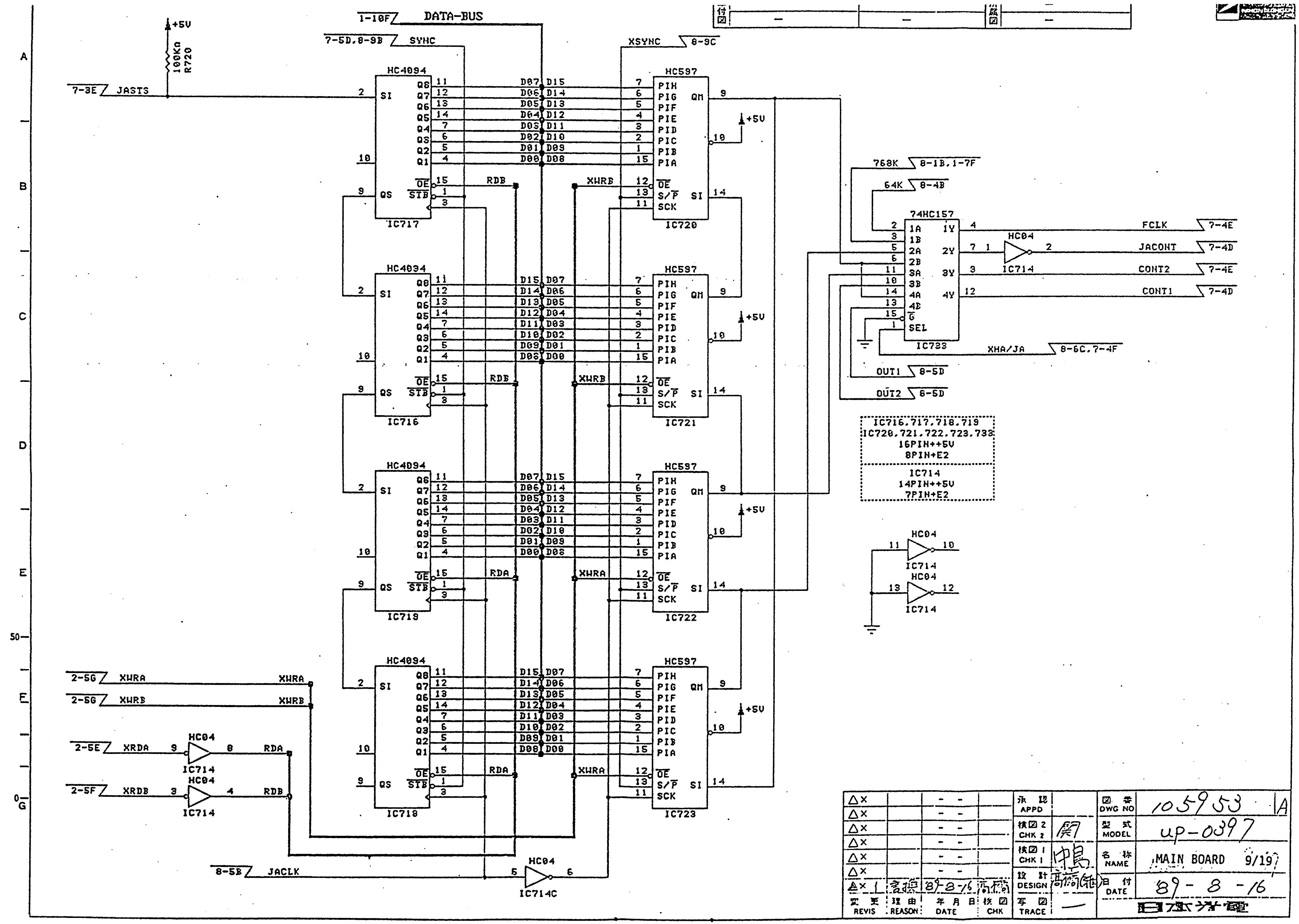

MAIN BOARD
DWG NO 1039494
MODEL UP-0397
DATE 89-8-16
89.12.27
日本光電 図面管理係
HC273 IC139
AC244 IC138
AC244 IC136
HM58C65 IC141
MSM6242 IC140
TMP82C51AN IC137
HC00 IC142
LS07 IC186
AC04 IC109
DATA-BUS
CONTROL-BUS
ADDRES-BUS
CLOCK
32.768KHZ X101
VC101 30PF
C104 22PF
R109 10KΩ
R228-R235 100KΩX8
R236-R239 100KΩX4
R240-R243 100KΩX4
L128-133 ELKTU1016 OR 0Ω R
L122-127,134 B-02-R OR 0Ω R
J004 PCH10EA-52S-2.54DSA(85) TO CRTC
IC136,136,133 20PIN+5V 10PIN+E2
ICB17 14PIN→+5V 7PIN→E2
KEY 0
KEY 1
KEY 2
KEY 3
KEY 4
KEY 5
KEY 6
XADP
XRPRST
EXUID
PUMP+
PUMP-
ECRT
+12BP
+12UCRT
ESND
SND
UMM
XRTS
XSDOUT
XCTS
XSDIN
XE2PSL
XRST
XWDS
XSWSL
XINTA
XBGACK
XDCH6
IKDI
R/XB
XNIBPSL
19.2K
RST
PWDWN
XRTCSL
XWRIO
XRDIO
TPCLOCK

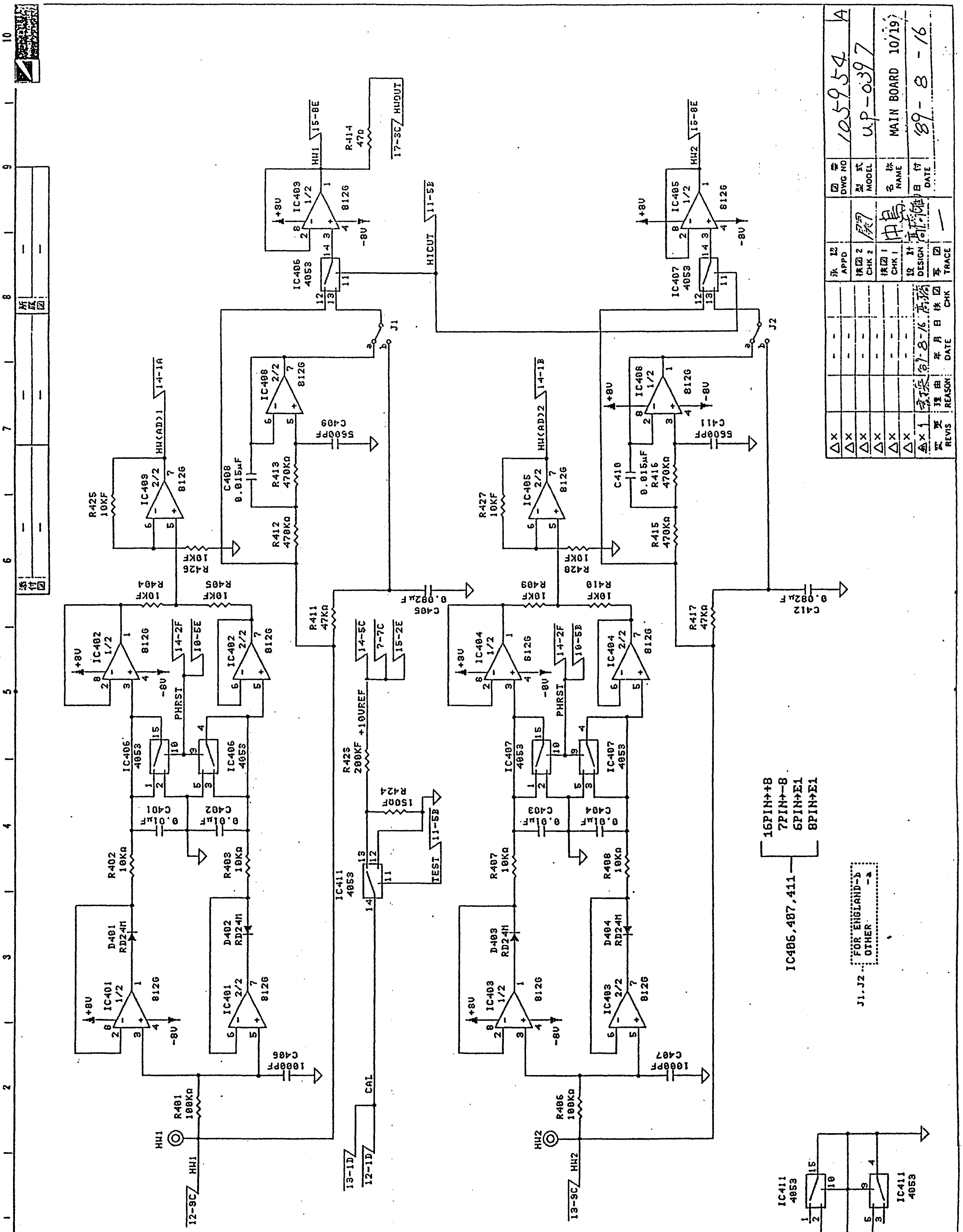

1-10B ADDRESS-BUS
1-10E DATA-BUS
2-3E EBUS
RA108 10KΩX8
RA107 10KΩX8
RA109 10KΩX8
RA111 10KΩX8
RA110 10KΩX8
+5V
74AC373
IC151
IC152
IC153
74AC245
IC154
IC155
J007c J008c J009c
J007d J008d J009d
J007e J008e J009e
J007f J008f J009f
XEBUS 2-1E
R/XW
XAS
XUDS
XLDS
CPUCLK
74AC74
IC157
IC158
IC159
10KΩ R145
10KΩ R146
10KΩ R147
10KΩ R149
100KΩ R722
R721 100KΩ
LS07
IC704
HC04
IC705
12 XIRQ 8-9F
2 XGIRQ 8-9E
IC157.158.159
14PIN→+5V
7PIN→E2
J007,J008,J009
PCN10EA-90S-2.54DSA
J007,J008,J009
——a See 19/19
——b See 15/19
1KΩ R110
XDTACK
AC04
IC156
LS07
IC106
DATIM-1 8-2F
XOGPINT 1-1G
2-7C AS
XRST
RST
XEXTINT 1-4F
XCPUCLK
24M 1-1A
1-7A CONTROL-BUS
INTENS 17-3E
EXUID 5-9B
A
B
C
D
E
F
G
50
0

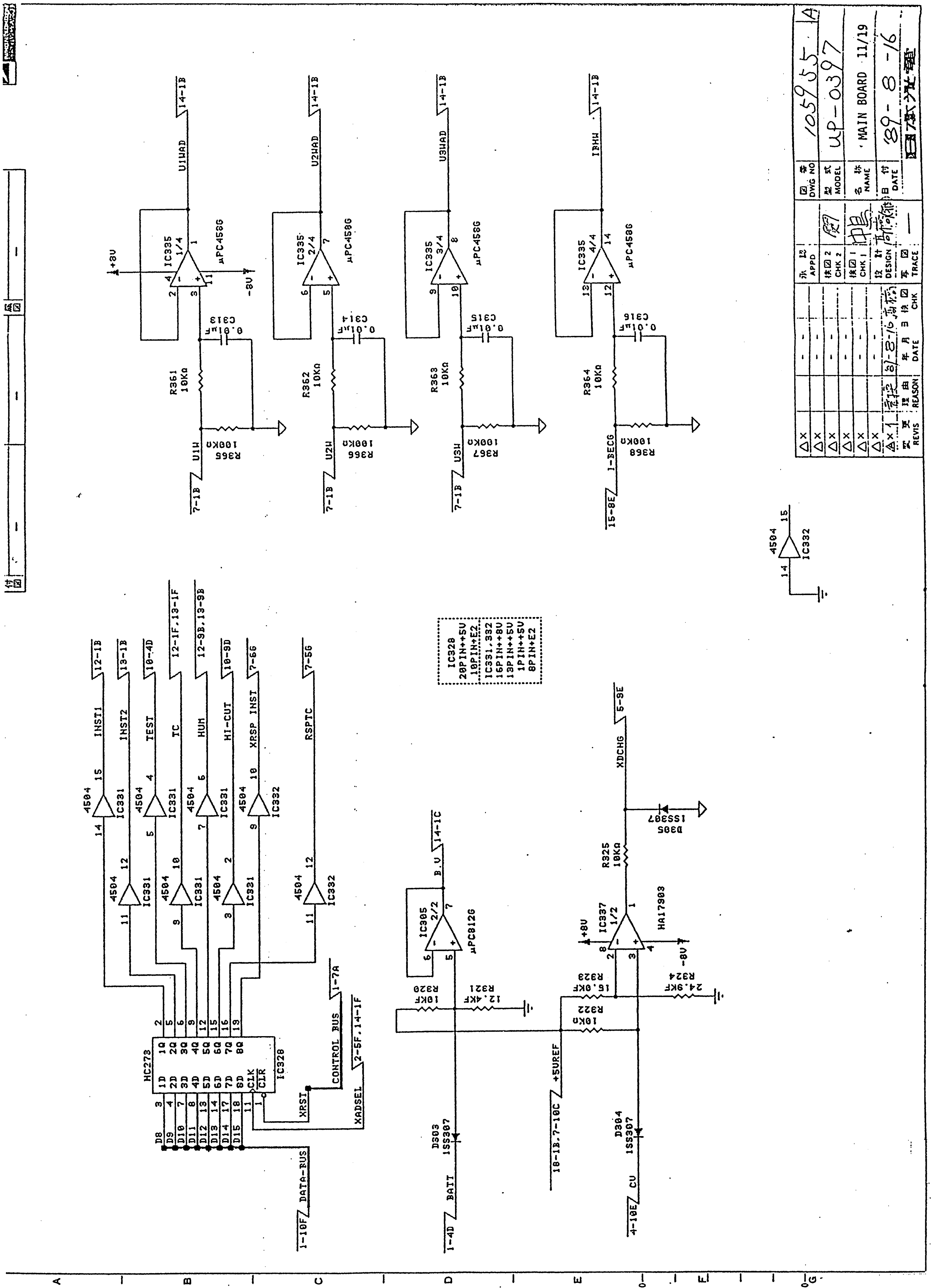
変更 REVIS	理由 REASON	年月日 DATE	検図 CHK				
△×		- -		承認 APPD		図番 DWG NO	105950 A
△×		- -		検図2 CHK 2	関	型式 MODEL	UP-0397
△×		- -		検図1 CHK 1	中島	名称 NAME	MAIN BOARD 6/19
△×		- -		設計 DESIGN	高橋(他)	日付 DATE	89-8-16
△×		- -		写図 TRACE	—		日本光電
△×		- -					
△×1	書換	89-8-15	高橋				


MAIN BOARD 7/19
0203-020478
UP-0397
'89-8-16
91-5-13
1991年 7月新コードに切替
旧図番 105951 B
JLC113JF(4051)
IC708
IC707 μPC812
IC701 μPC812
IC710 μPC812
IC712 HA-17903
IC702 4504
IC703 LS07
IC704 LS07
IC705 HC04
IC706 4053
IC711 4053
IC709 7815
J001 FFC-34BSH1#2
L712-730 ELXTU1016A
L701,L704-711 B-02-R OR 0Ω R
D701 1SS226
D702 1SS226
D703 1SS226
Q701 A1122
Q702 C2712
VR701 500Ω
PAR1
PAR2
PAR3
PAR4
2CH ECG
250HZ
125HZ
62HZ
4KHZ
8KHZ
+5UREF
+10UREF
SYNC
JACONT
CONT1
CONT2
FCLK
RCLK
XHA/JA
JASIS
XHARST
XRSPOF
XADP
ECG1
ECG2
U3W
U2H
U1H
RESP
XRSPINST
RSPTC
RSP(HA)
RSP(JA)
ER
EHC
EH
E1
EP
E3
+8U
-8U
+15

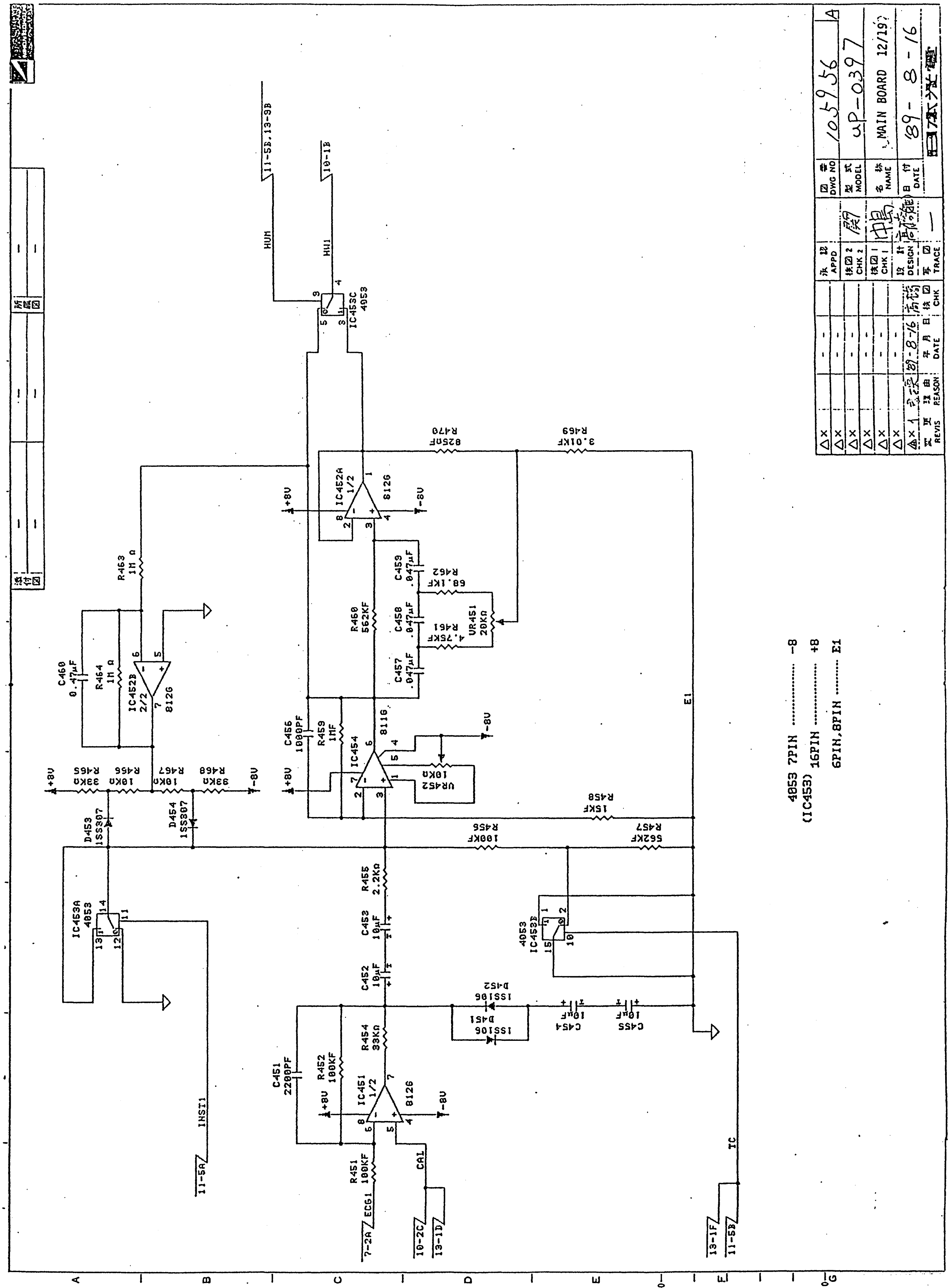

出図
'89.12.27
日本光電
図面管理係
図番 DWG NO 1059 52 B
型式 MODEL UP-0397
名称 NAME MAIN BOARD 8/19
日付 DATE '89-12-4
日本光電
HC74 IC726
HC74 IC313
HC4040 IC725
HC151 IC724
HC390 IC732
HC273 IC729
HC74 IC730
HC74 IC731
HC02 IC727
HC04 IC310
DATA-BUS
CONTROL BUS
SYNC
XSYNC
XJACONT
XRST
RST
X6IRQ
XIRQ
XDMAINT
XACRTCINT
XADINT
XRSPOF
DATIN-0
DATIN-1
XRTCINT
TPCLOCK
RCLK (153.6KHZ)
768K
64K
4KHZ
JACLK
250HZ
125HZ
62HZ
8KHZ
OUT1
OUT2
XHARST
XHA/JA
+5V
IC724,725,732 16PIN+5V 8PIN+E2
IC729 20PIN+5V 10PIN+E2
IC726,727,730,731 14PIN+5V 7PIN+E2

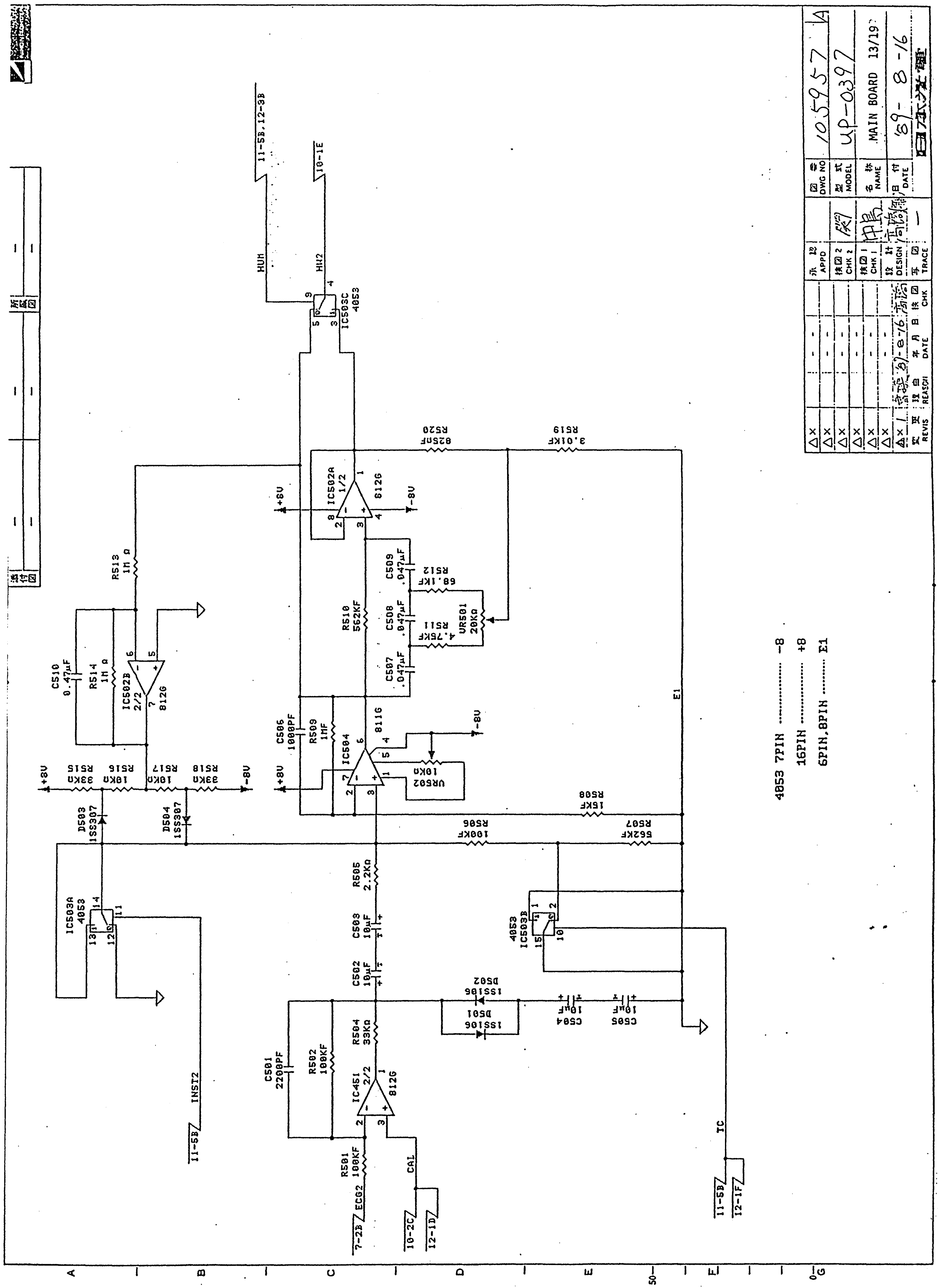

1-10F DATA-BUS
7-5D,8-9B SYHC
XSYNC 8-9C
7-3E JASTS
+5V
100KΩ R720
HC4094 IC717
HC4094 IC716
HC4094 IC719
HC4094 IC718
SI QS Q8 Q7 Q6 Q5 Q4 Q3 Q2 Q1 OE STB
HC597 IC720
HC597 IC721
HC597 IC722
HC597 IC723
PIH PIG PIF PIE PID PIC PIB PIA OE S/P SCK QH SI
D07 D15 D06 D14 D05 D13 D04 D12 D03 D11 D02 D10 D01 D09 D00 D08
RDB XWRB RDA XWRA
768K 8-1B,1-7F
64K 8-4B
74HC157 IC733
1A 1B 2A 2B 3A 3B 4A 4B G SEL 1Y 2Y 3Y 4Y
HC04 IC714
FCLK 7-4E
JACONT 7-4D
CONT2 7-4E
CONT1 7-4D
XHA/JA 8-6C,7-4F
OUT1 8-5D
OUT2 6-5D
IC716,717,718,719
IC720,721,722,723,733
16PIN→+5V
8PIN→E2
IC714
14PIN→+5V
7PIN→E2
2-5G XWRA
2-5G XWRB
2-5E XRDA
2-5F XRDB
8-5B JACLK
HC04 IC714C
A B C D E F G 50 0
△× REVIS 変更
REASON 理由
DATE 年 月 日
CHK 検図
△× 1 言換 89-8-16 高橋
APPD 承認
CHK 2 検図 2 関
CHK 1 検図 1 中島
DESIGN 設計 高橋(雅)
TRACE 写図 —
DWG NO 図番 105953 A
MODEL 型式 UP-0397
NAME 名称 MAIN BOARD 9/19
DATE 日付 89-8-16

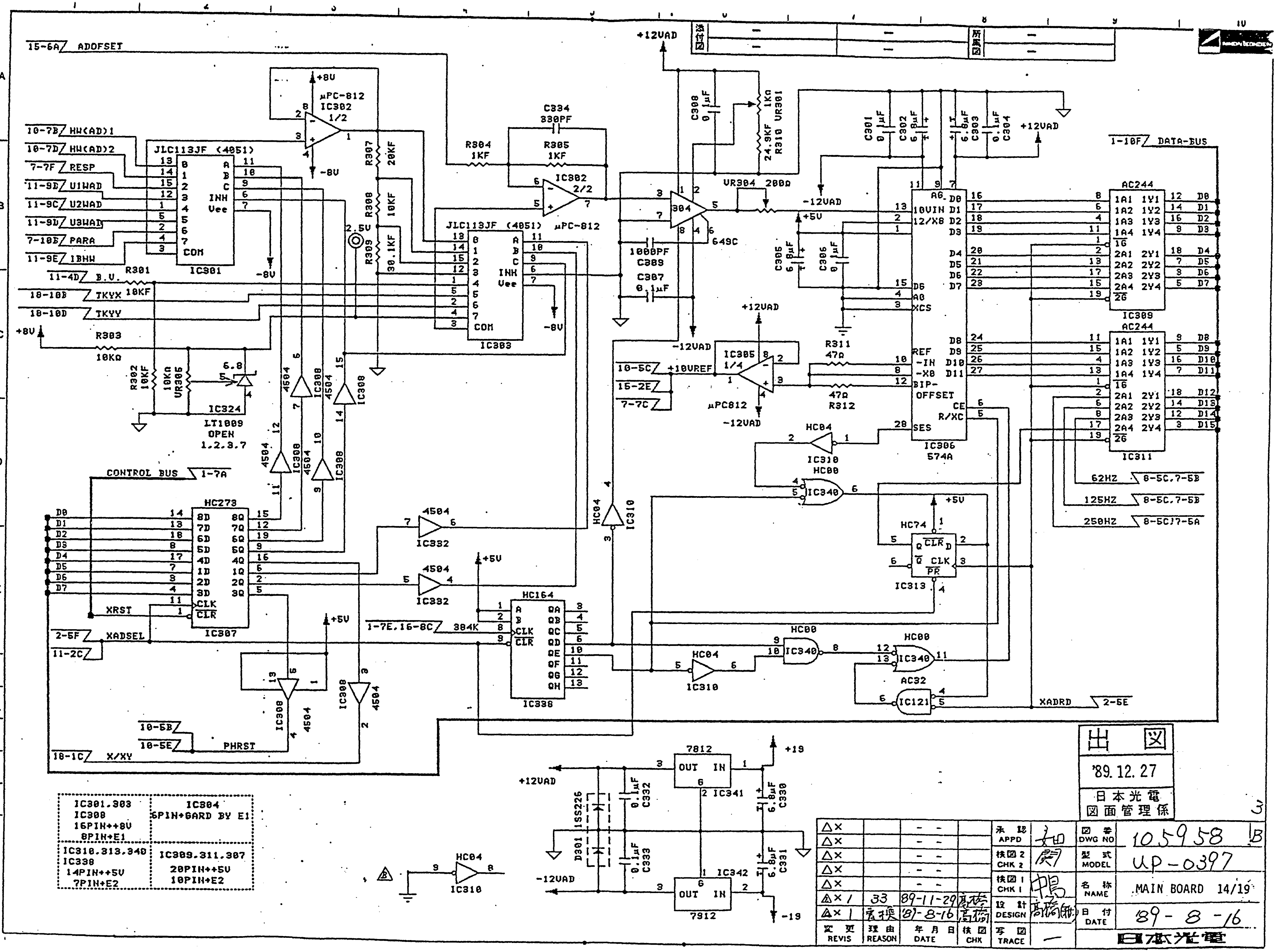

DWG NO 105954 A
MODEL UP-0397
NAME MAIN BOARD 10/19
DATE 89-8-16
APPD
CHK 2
CHK 1
DESIGN
TRACE
REVIS
REASON
DATE
CHK
IC401 1/2 8126
IC401 2/2 8126
D401 RD24M
D402 RD24M
R401 100KΩ
R402 10KΩ
R403 10KΩ
C401 0.01µF
C402 0.01µF
C406 1000PF
IC406 4053
IC402 1/2 8126
IC402 2/2 8126
PHRST
14-2F
10-5E
R404 10KF
R405 10KF
R426 10KF
IC409 2/2 8126
R425 10KF
HH(AD)1
14-1A
R411 47KΩ
R412 470KΩ
R413 470KΩ
C408 0.015µF
IC408 2/2 8126
C409 5600PF
J1
IC409 1/2 8126
HH1
15-8E
R414 47Ω
17-3C
HHOUT
HICUT
11-5E
C405 0.082µF
14-5C
7-7C
15-2E
R423 200KF
+10VREF
R424 150ΩF
IC411 4053
TEST
11-5E
CAL
13-1D
12-1D
HH1
12-9C
HH2
13-9C
R406 100KΩ
IC403 1/2 8126
IC403 2/2 8126
D403 RD24M
D404 RD24M
R407 10KΩ
R408 10KΩ
C403 0.01µF
C404 0.01µF
C407 1000PF
IC407 4053
IC404 1/2 8126
IC404 2/2 8126
PHRST
14-2F
16-5E
R409 10KF
R410 10KF
R428 10KF
IC405 2/2 8126
R427 10KF
HH(AD)2
14-1B
R415 470KΩ
R416 470KΩ
C410 0.015µF
IC408 1/2 8126
C411 5600PF
J2
IC405 1/2 8126
HH2
15-8E
R417 47KΩ
C412 0.082µF
+8V
-8V
IC406,407,411
16PIN→+8
7PIN→-8
6PIN→E1
8PIN→E1
J1,J2
FOR ENGLAND-b
OTHER -a
A
B
C
D
E
F
G
1
2
3
4
5
6
7
8
9
10

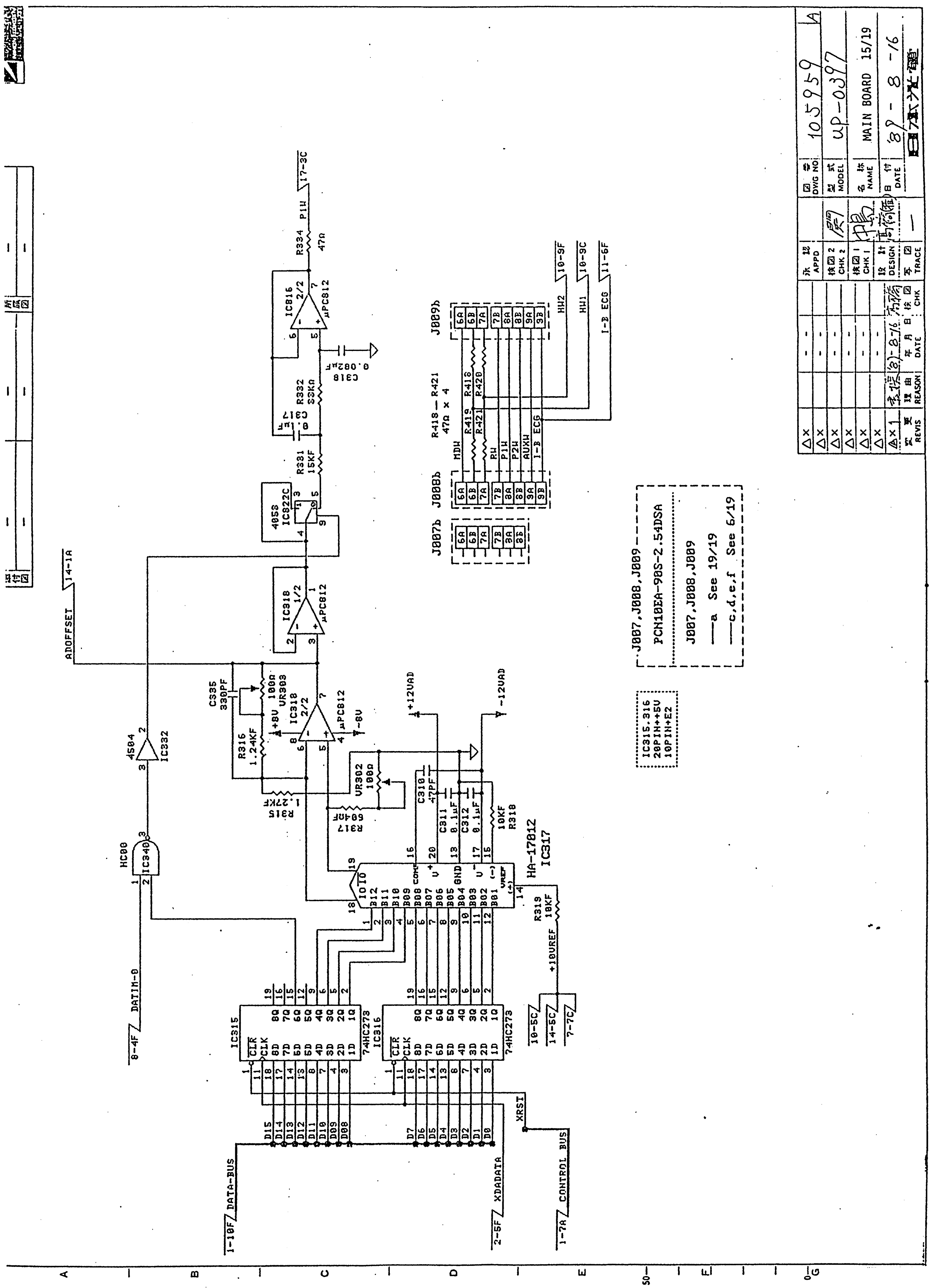


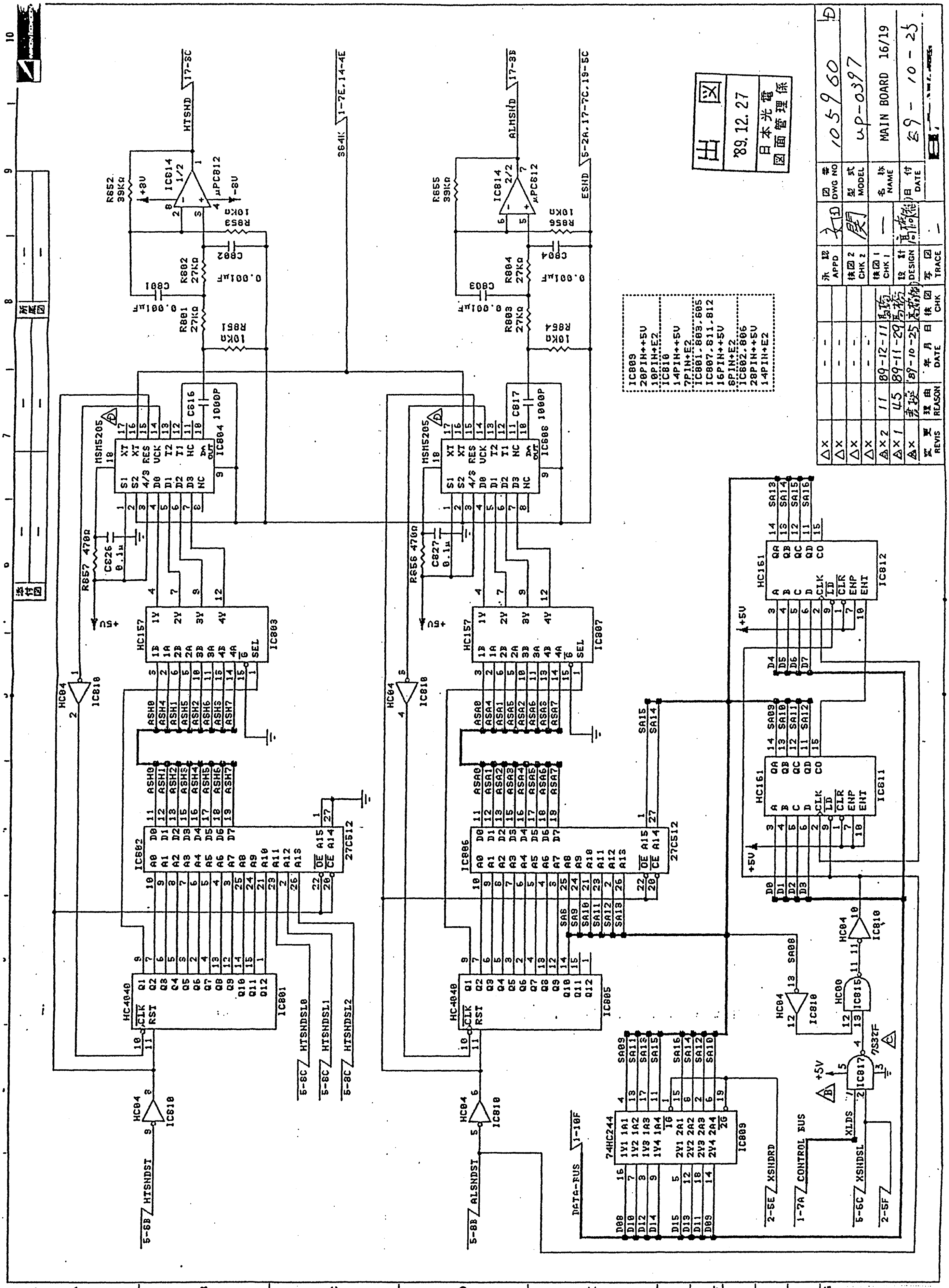
DWG NO 1059.55 A
MODEL UP-0397
NAME MAIN BOARD 11/19
DATE '89-8-16
APPD
CHK 2
CHK 1
DESIGN
TRACE
REVIS
REASON
DATE
CHK
IC335 1/4
IC335 2/4
IC335 3/4
IC335 4/4
μPC458G
U1HAD
U2HAD
U3HAD
IBHW
14-1B
U1W
U2W
U3W
1-BECG
7-1B
15-8E
R361 10KΩ
R362 10KΩ
R363 10KΩ
R364 10KΩ
R365 100KΩ
R366 100KΩ
R367 100KΩ
R368 100KΩ
C313 0.01μF
C314 0.01μF
C315 0.01μF
C316 0.01μF
+8V
-8V
IC332 4504
INST1 12-1B
INST2 13-1B
TEST 10-4D
TC 12-1F.13-1F
HUM 12-9B.13-9B
HI-CUT 10-9D
XRSP INST 7-6G
RSPTC 7-5G
IC331
4504
IC328 HC273
1D 2D 3D 4D 5D 6D 7D 8D CLK CLR
1Q 2Q 3Q 4Q 5Q 6Q 7Q 8Q
D8 D9 D10 D11 D12 D13 D14 D15
DATA-BUS 1-10F
CONTROL BUS 1-7A
XRST
XADSEL 2-5F.14-1F
IC328 20PIN++5V 10PIN+E2
IC331.332 16PIN++8V 13PIN++5V 1PIN++5V 8PIN+E2
IC305 2/2 μPC812G
B.V 14-1C
R320 10KF
R321 12.4KF
D303 1SS307
BATT 1-4D
+5VREF 18-1B.7-10C
R322 10KΩ
R323 15.0KF
R324 24.9KF
IC337 1/2 HA17903
R325 10KΩ
D305 1SS307
XDCHG 5-9E
D304 1SS307
CV 4-10E
A B C D E F G

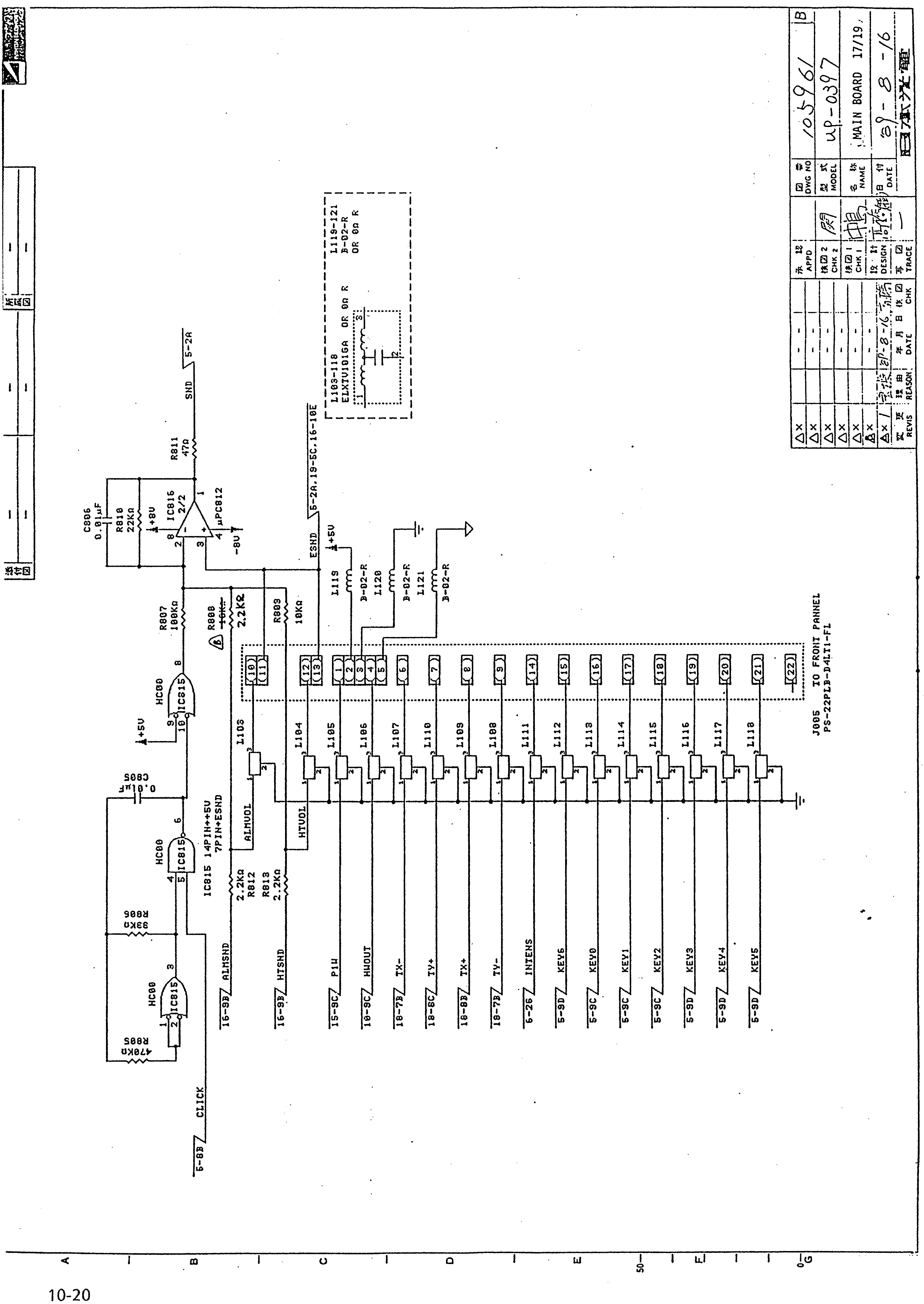

IC451 1/2 8126
IC452A 1/2 8126
IC452B 2/2 8126
IC453A 4053
IC453B 4053
IC453C 4053
IC454 8116
R451 100KF
R452 100KF
R454 33KΩ
R455 2.2KΩ
R456 100KF
R457 562KF
R458 15KF
R459 1MF
R460 562KF
R461 4.75KF
R462 68.1KF
R463 1M Ω
R464 1M Ω
R465 33KΩ
R466 10KΩ
R467 10KΩ
R468 93KΩ
R469 3.01KF
R470 825ΩF
VR451 20KΩ
VR452 10KΩ
C451 2200PF
C452 10μF
C453 10μF
C454 10μF
C455 10μF
C456 1000PF
C457 .047μF
C458 .047μF
C459 .047μF
C460 0.47μF
D451 1SS106
D452 1SS106
D453 1SS307
D454 1SS307
+8V
-8V
E1
HUM
HU1
INST1
CAL
TC
7-2A
EC61
10-2C
13-1D
13-1F
11-5B
11-5A
10-1B
11-5B,13-9B
4053 7PIN .... -8
(IC453) 16PIN .... +8
6PIN,8PIN E1
A
B
C
D
E
F
G
50
0
図番 DWG NO 105956 A
型式 MODEL UP-0397
名称 NAME MAIN BOARD 12/19
日付 DATE '89-8-16
承認 APPD
検図2 CHK 2 関
検図1 CHK 1 中島
設計 DESIGN 高橋
写図 TRACE —
△× 1 追加 '89-8-16 高橋
変更 REVIS
理由 REASON
年月日 DATE
検図 CHK


DWG NO 105957 A
MODEL UP-0397
NAME MAIN BOARD 13/19
DATE 89-8-16
APPD
CHK 2
CHK 1
DESIGN
TRACE
REVIS
REASON
DATE
CHK
1
89-8-16
4053 7PIN .... -8
16PIN .... +8
6PIN,8PIN E1
11-5B,12-3B
10-1E
HUM
HH2
IC503C
4053
IC502A
1/2
8126
+8V
-8V
R520
825ΩF
R519
3.01KF
R513
1M Ω
C510
0.47μF
R514
1M Ω
IC502B
2/2
8126
C509
.047μF
R512
68.1KF
R510
562KF
C508
.047μF
R511
4.75KF
UR501
20KΩ
C507
.047μF
C506
1000PF
R509
1MF
IC504
8116
UR502
10KΩ
R515
33KΩ
R516
10KΩ
R517
10KΩ
R518
33KΩ
D503
1SS307
D504
1SS307
R508
16KF
R506
100KF
R507
562KF
E1
IC503A
4053
R505
2.2KΩ
C503
10μF
C502
10μF
4053
IC503B
D502
1SS106
D501
1SS106
C504
10μF
C505
10μF
C501
2200PF
R502
100KF
R504
33KΩ
IC451
2/2
8126
INST2
11-5B
R501
100KF
ECG2
7-2B
CAL
10-2C
12-1D
IC
11-5B
12-1F
A
B
C
D
E
F
G
50
0

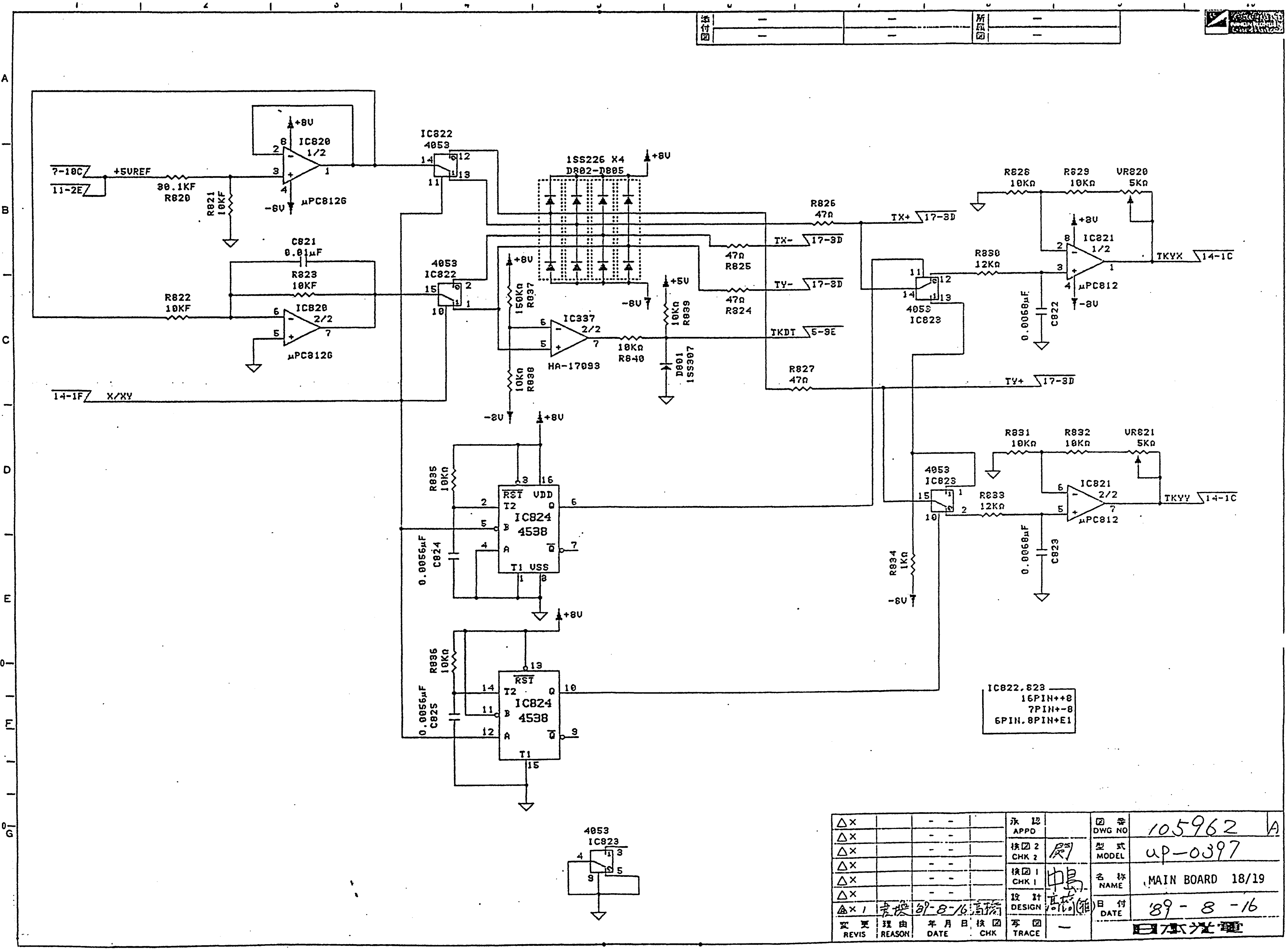

15-6A ADOFSET
10-7B HW(AD)1
10-7D HW(AD)2
7-7F RESP
11-9E U1WAD
11-9C U2WAD
11-9D U3WAD
7-10E PARA
11-9E IBHW
11-4D B.U.
10-10B TKYX
10-10D TKYY
JLC113JF (4051)
IC301
IC303
μPC-812
IC302 1/2
IC302 2/2
C334 330PF
R304 1KF
R305 1KF
R307 20KF
R308 10KF
R309 30.1KF
2.5V
R301 10KF
R302 10KF
R303 10KΩ
UR306 10KΩ
IC324 LT1009
OPEN 1.2.3.7
6.8
+8V
-8V
+12VAD
-12VAD
+5V
304
649C
UR304 200Ω
C308 0 μF
R310 24.9KF
UR301 1KΩ
C389 1000PF
C307 0.1μF
C305 6.8μF
C306 0 μF
IC305 1/4
μPC812
+10VREF
10-5C
15-2E
7-7C
R311 47Ω
R312 47Ω
C301 0 μF
C302 6 8μF
C303 6.8μF
C304 0.1μF
IC306 574A
A6 D0 D1 D2 D3 D4 D5 D6 D7 D8 D9 D10 D11
10VIN 12/X8 D6 A0 XCS REF -IN -X8 BIP-OFFSET CE R/XC SES
1-10F DATA-BUS
AC244
IC309
IC311
62HZ 8-5C,7-5B
125HZ 8-5C,7-5B
250HZ 8-5C,7-5A
XADRD 2-5E
HC04
IC310
HC00
IC340
HC74
IC313
AC32
IC121
CONTROL BUS 1-7A
HC273
IC307
XRST
XADSEL
2-5F
11-2C
4504
IC308
IC332
HC164
IC338
1-7E,16-8C
384K
10-5B
10-5E
PHRST
10-1C X/XY
7812
IC341
7912
IC342
+19
-19
C330 6.8μF
C331 6.8μF
C332 0.1μF
C333 0.1μF
D301 1SS226
IC301.303 IC308 16PIN++8V 8PIN+E1
IC304 8PIN+GARD BY E1
IC310.313.340 IC338 14PIN++5V 7PIN+E2
IC309.311.307 20PIN++5V 10PIN+E2
出図
'89.12.27
日本光電 図面管理係
3
変更 REVIS
理由 REASON
年月日 DATE
検図 CHK
△×1 33 89-11-29 高橋
△×1 言換 '89-8-16 高橋
承認 APPD 知
検図2 CHK 2 関
検図1 CHK 1 中嶋
設計 DESIGN 高橋(敏)
写図 TRACE —
図番 DWG NO 105958 B
型式 MODEL UP-0397
名称 NAME MAIN BOARD 14/19
日付 DATE '89-8-16
日本光電


DWG NO 105959 A
MODEL UP-0397
NAME MAIN BOARD 15/19
DATE 89-8-16
APPD
CHK 2
CHK 1
DESIGN
TRACE
REVIS
REASON
DATE
CHK
1-10F DATA-BUS
2-5F XDADATA
1-7A CONTROL BUS
8-4F DATIM-0
XRSI
D15 D14 D13 D12 D11 D10 D09 D08
D7 D6 D5 D4 D3 D2 D1 D0
IC315 74HC273
IC316 74HC273
CLR CLK
8D 7D 6D 5D 4D 3D 2D 1D
8Q 7Q 6Q 5Q 4Q 3Q 2Q 1Q
HC00 IC340
4584 IC332
ADOFFSET 14-1A
HA-17012 IC317
IOIO COM U+ GND U- VREF(-) VREF(+)
B12 B11 B10 B09 B08 B07 B06 B05 B04 B03 B02 B01
R319 10KF
+10VREF
10-5C
14-5C
7-7C
R318 10KF
C310 47PF
C311 0.1uF
C312 0.1uF
+12VAD
-12VAD
VR302 100Ω
R317 604ΩF
R315 1.27KF
R316 1.24KF
C335 330PF
VR303 100Ω
IC318 2/2 µPC812
+8V
-8V
IC318 1/2 µPC812
4053 IC822C
R331 15KF
C317 0.1µF
R332 33KΩ
C318 0.082µF
IC816 2/2 µPC812
R334 47Ω
P1H
17-3C
J007b
J008b
J009b
R418 — R421 47Ω x 4
MDH
R419
R421
R416
R420
RH
P1H
P2H
AUXH
I-B ECG
HH2 10-9F
HH1 10-9C
I-B ECG 11-6F
IC315,316 20PIN→+5V 10PIN→E2
J007,J008,J009
PCN10EA-98S-2.54DSA
J007,J008,J009
—a See 19/19
—c,d,e,f See 6/19
A B C D E F G

 MAIN BOARD 16/19
DWG NO 105960
MODEL up-0397
DATE 89-10-25
出図 '89.12.27 日本光電 図面管理係
APPD
CHK 2
CHK 1
DESIGN
TRACE
REVIS
REASON
DATE
CHK
ΔX2 11 89-12-11
ΔX1 45 89-11-29
ΔX 89-10-25
IC809 20PIN→+5V 10PIN→E2
IC810 14PIN→+5V 7PIN→E2
IC801,803,805 IC807,811,812 16PIN→+5V 8PIN→E2
IC802,806 28PIN→+5V 14PIN→E2
HTSNDST 5-6B
ALSNDST 5-8B
HTSNDS10 5-8C
HTSNDSL1 5-8C
HTSNDS12 5-8C
HTSND 17-5C
ALMSND 17-3B
S64K 1-7E,14-4E
ESND 5-2A,17-7C,19-5C
DATA-BUS 1-10F
XSNDRD 2-5E
CONTROL BUS 1-7A
XSNDSL 5-6C
XLDS 2-5F
IC801 HC4040
IC805 HC4040
IC802 27C512
IC806 27C512
IC803 HC157
IC807 HC157
IC804 MSM5205
IC808 MSM5205
IC809 74HC244
IC810 HC04
IC811 HC161
IC812 HC161
IC815 HC00
IC817 7S32F
IC814 1/2 μPC812
IC814 2/2 μPC812
R652 39KΩ
R655 39KΩ
R853 10KΩ
R856 10KΩ
R861 10KΩ
R864 10KΩ
R801 27KΩ
R802 27KΩ
R803 27KΩ
R804 27KΩ
C801 0.001μF
C802 0.001μF
C803 0.001μF
C804 0.001μF
C816 1000P
C817 1000P
C826 0.1μ
C827 0.1μ
R657 470Ω
R656 470Ω
+5V
+8V
-8V
ASH0 ASH1 ASH2 ASH3 ASH4 ASH5 ASH6 ASH7
ASA0 ASA1 ASA2 ASA3 ASA4 ASA5 ASA6 ASA7
SA08 SA09 SA10 SA11 SA12 SA13 SA14 SA15 SA16
D0 D1 D2 D3 D4 D5 D6 D7
D08 D10 D12 D14 D15 D13 D11 D09
A B C D E F G
1 2 3 4 5 6 7 8 9 10

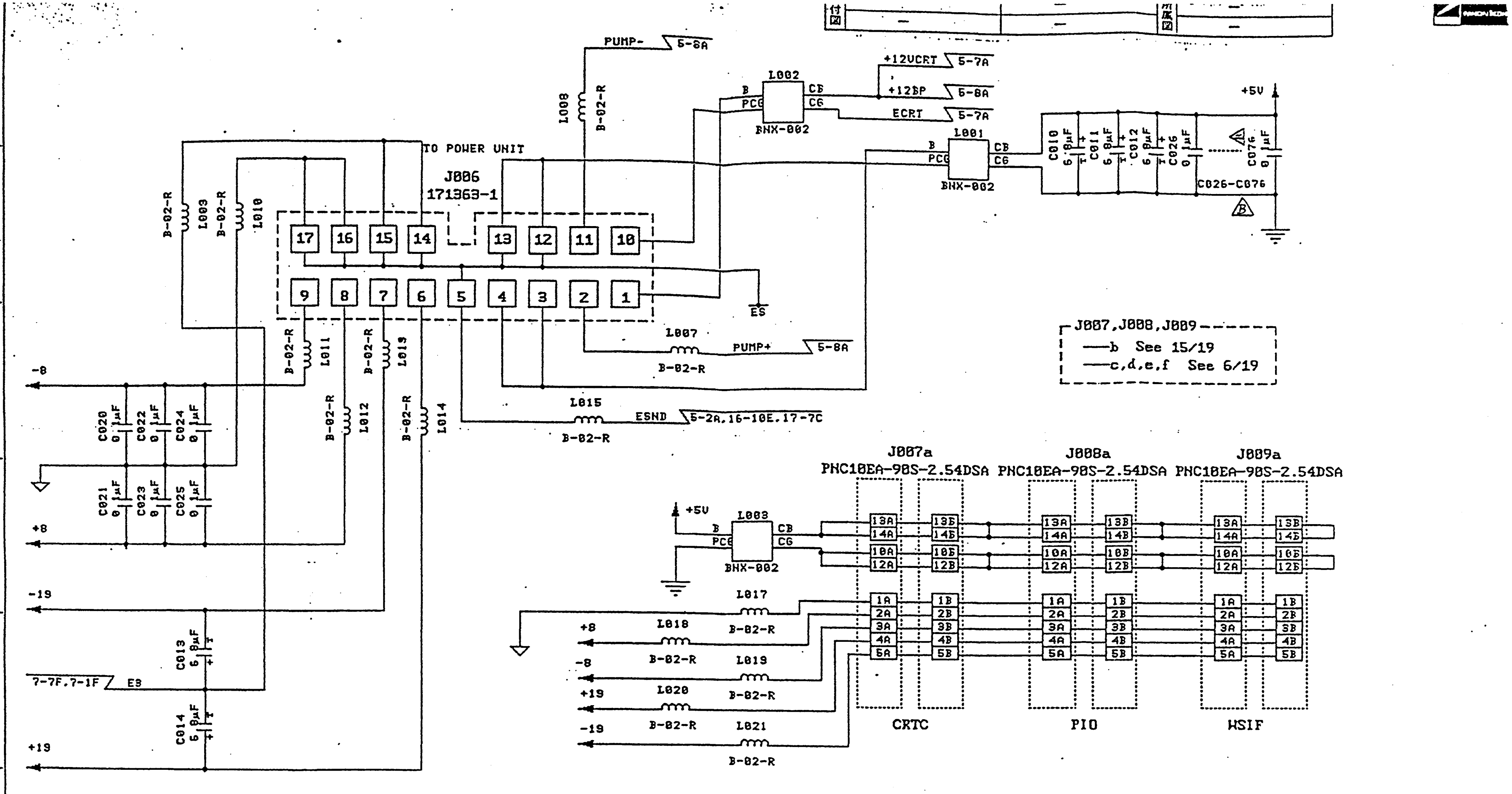


CLICK 5-8B
IC815 HC00
R805 470KΩ
R806 33KΩ
C805 0.01μF
IC815 14PIN→+5V 7PIN→ESND
R812 2.2KΩ
R813 2.2KΩ
ALMVOL
HTVOL
R807 100KΩ
R808 ~~10K~~ 2.2KΩ
R803 10KΩ
C806 0.01μF
R810 22KΩ
IC816 2/2 μPC812
+8V
-8V
R811 47Ω
SND 5-2A
ESND 5-2A,19-5C,16-10E
+5V
L119 B-02-R
L120 B-02-R
L121 B-02-R
L103–L118
J005 PS-22PLB-D4LT1-FL TO FRONT PANNEL
L103-118 ELXTV101GA OR 0Ω R
L119-121 B-02-R OR 0Ω R
16-9B ALMSND
16-9B HTSND
15-9C PLW
10-9C HWOUT
18-7B TX-
18-6C TY+
18-8B TX+
18-7B TY-
6-26 INTENS
5-9D KEY6
5-9C KEY0
5-9C KEY1
5-9C KEY2
5-9D KEY3
5-9D KEY4
5-9D KEY5
DWG NO 105961 B
MODEL up-0397
NAME MAIN BOARD 17/19
DATE 89-8-16
APPD
CHK 2
CHK 1
DESIGN
TRACE
REVIS
REASON
DATE
CHK
A B C D E F G



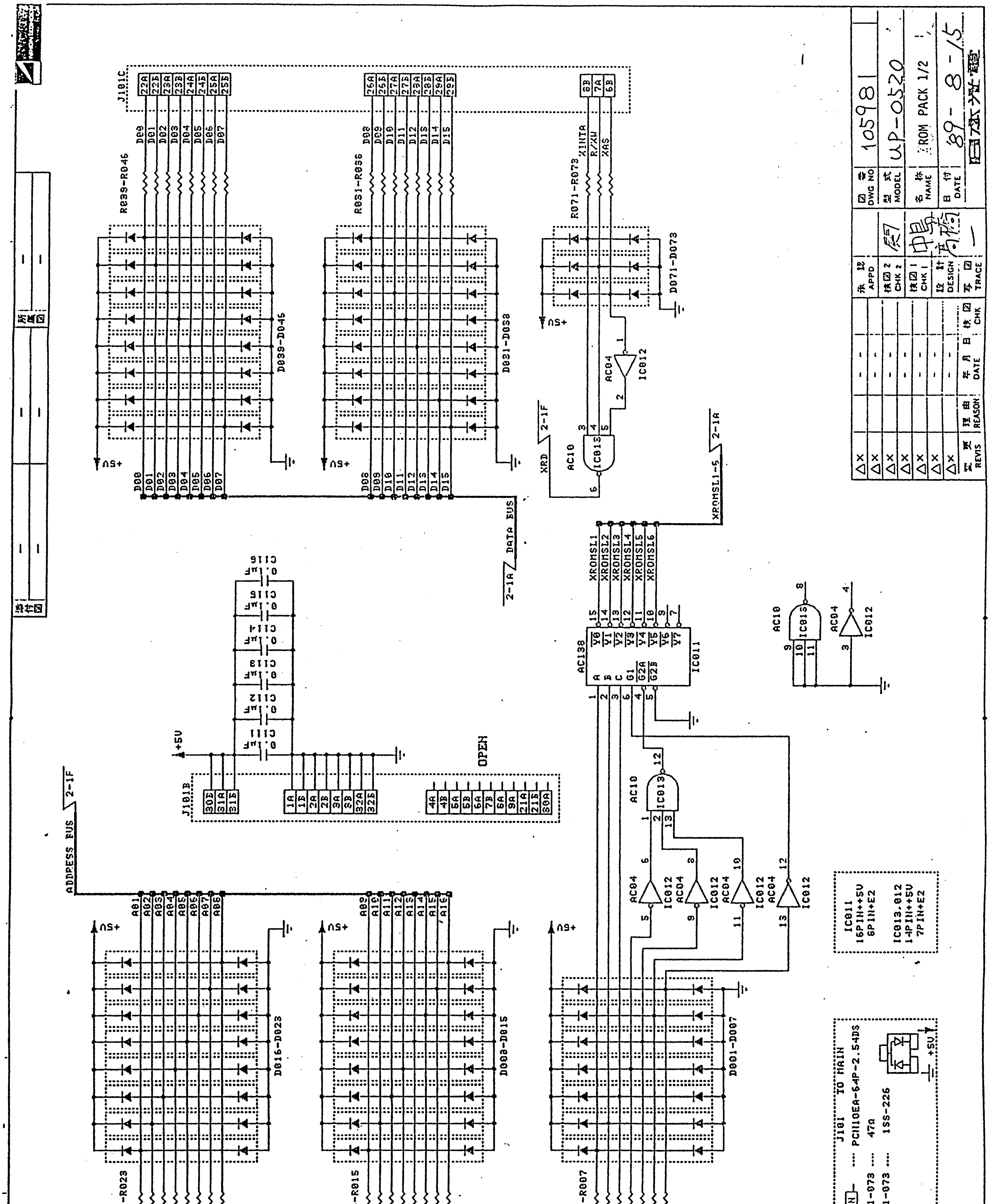
添付図 — —
所属図 —
7-10C
11-2E
+5VREF
30.1KF
R820
R821
10KF
IC820
1/2
+8V
-8V
μPC812G
C821
0.01μF
R823
10KF
R822
10KF
IC820
2/2
μPC812G
14-1F
X/XY
IC822
4053
14
12
11
13
4053
IC822
15
2
10
1
1SS226 X4
D802-D805
+8V
-8V
150KΩ
R837
IC337
2/2
6
5
7
HA-17093
10KΩ
R838
10KΩ
R840
+5V
10KΩ
R839
D801
1SS307
R826
47Ω
TX+
17-3D
TX-
17-3D
47Ω
R825
TY-
17-3D
47Ω
R824
TKDT
5-9E
R827
47Ω
TY+
17-3D
R828
10KΩ
R829
10KΩ
VR820
5KΩ
IC821
1/2
μPC812
TKYX
14-1C
R830
12KΩ
4053
IC823
11
12
14
13
0.0068μF
C822
R831
10KΩ
R832
10KΩ
VR821
5KΩ
IC821
2/2
μPC812
TKYY
14-1C
4053
IC823
15
1
10
2
R833
12KΩ
0.0068μF
C823
R834
1KΩ
-8V
R835
10KΩ
0.0056μF
C824
RST
VDD
T2
Q
IC824
4538
B
A
Q̄
T1
VSS
3
16
2
6
5
4
7
1
8
R836
10KΩ
0.0056μF
C825
RST
13
T2
14
Q
10
IC824
4538
B
11
A
12
Q̄
9
T1
15
IC822,823
16PIN++8
7PIN+-8
6PIN,8PIN+E1
4053
IC823
4
3
9
5
A
B
C
D
E
F
G
50

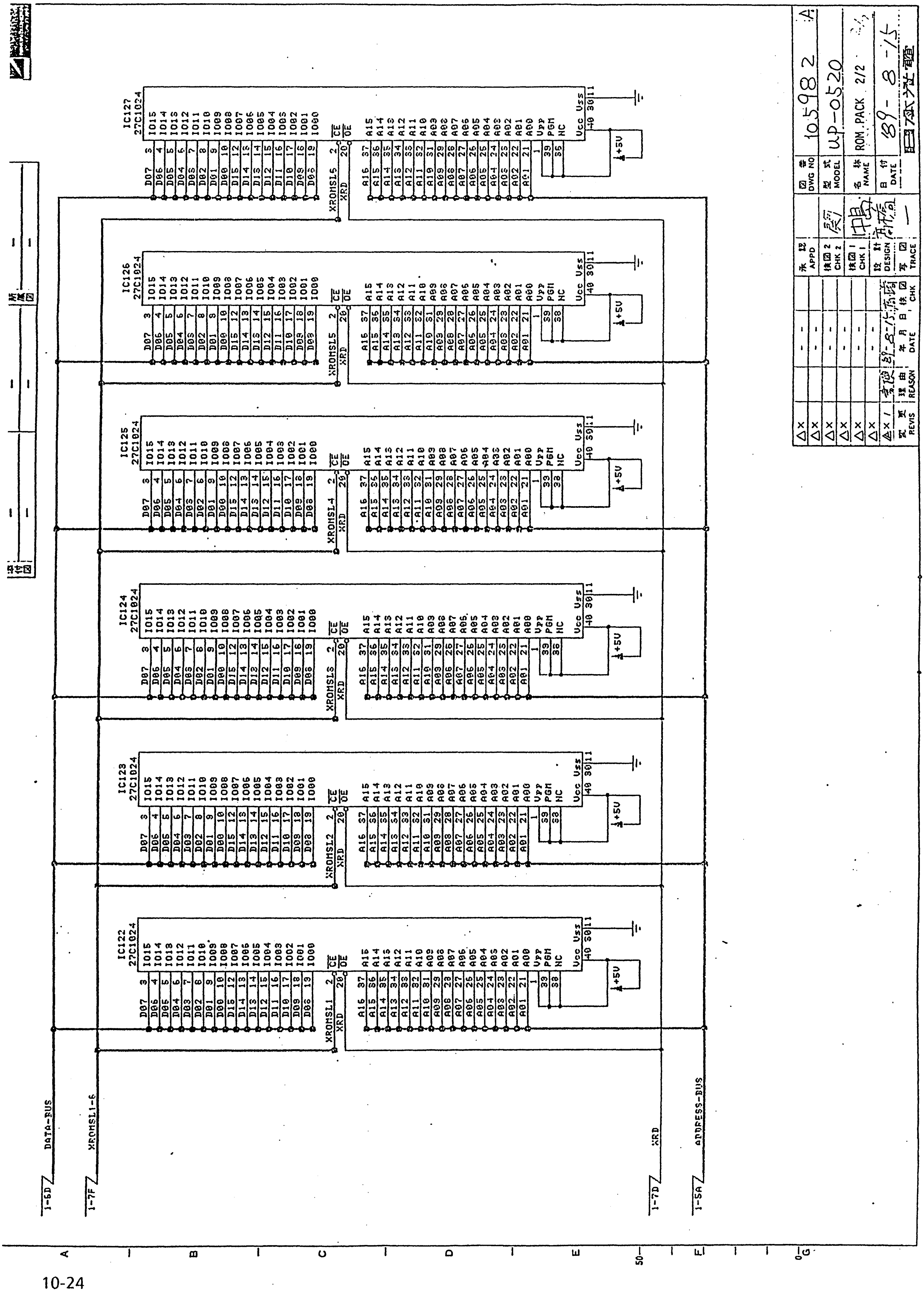
△×		- -		承認 APPD		図番 DWG NO	105962	A
△×		- -		検図 2 CHK 2	関	型式 MODEL	up-0397	
△×		- -		検図 1 CHK 1	中島	名称 NAME	MAIN BOARD 18/19	
△×		- -		設計 DESIGN	高橋(雅)	日付 DATE	'89 - 8 -16	
△×		- -		写図 TRACE	—	日本光電		
△×		- -						
△×1	変換	89-8-16	高橋					
変更 REVIS	理由 REASON	年月日 DATE	検図 CHK					

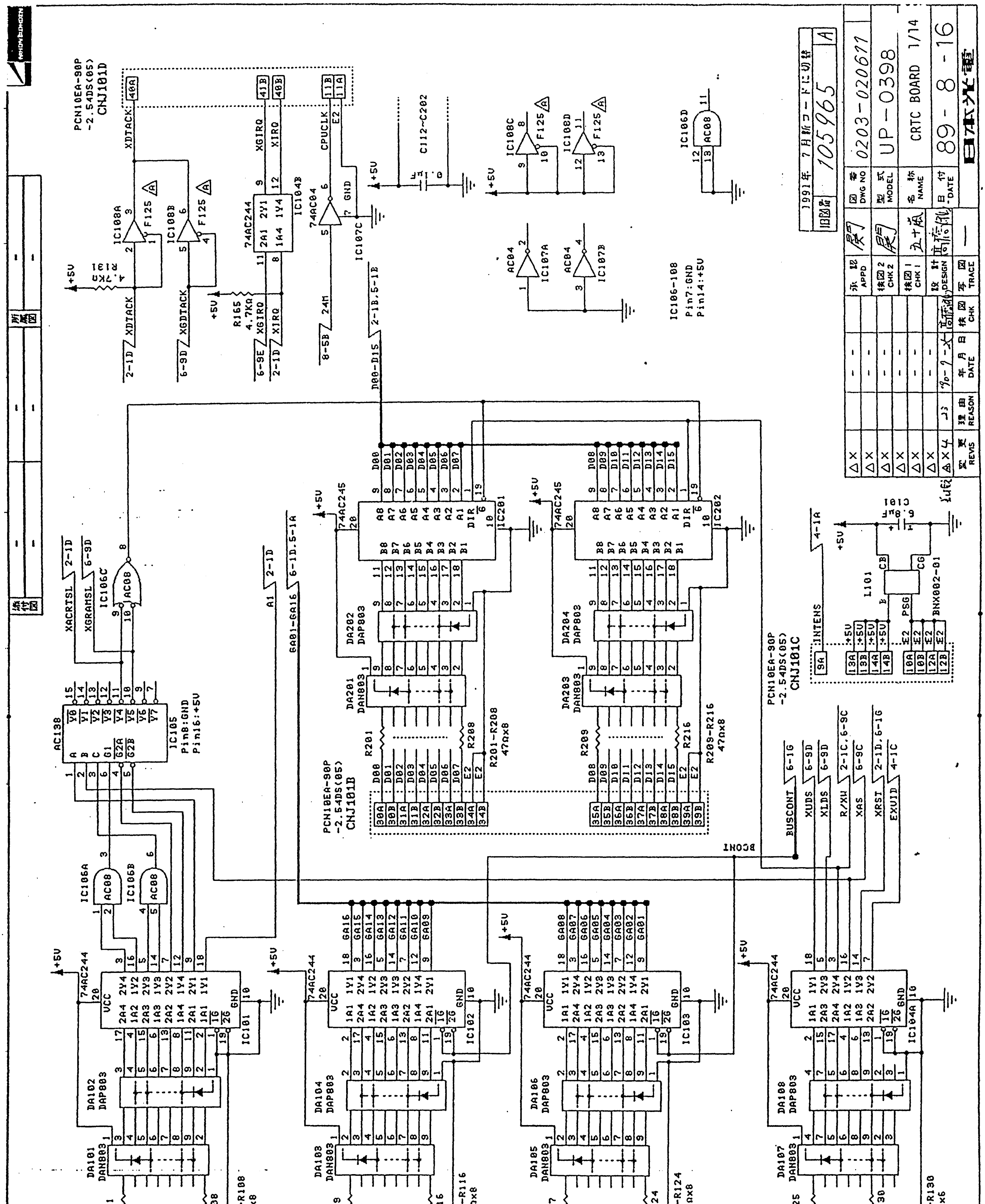

PUMP-
5-8A
L008
B-02-R
L002
B
PCG
CB
CG
BNX-002
+12VCRT
5-7A
+12BP
5-8A
ECRT
5-7A
L001
BNX-002
+5V
C010 6.8μF
C011 6.8μF
C012 6.8μF
C026 0.1μF
C076 0.1μF
C026-C076
TO POWER UNIT
J006
171363-1
B-02-R
L003
B-02-R
L010
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
ES
L007
B-02-R
PUMP+
5-8A
J007,J008,J009
—b See 15/19
—c,d,e,f See 6/19
L011
L019
L012
L014
L015
B-02-R
ESND
5-2A,16-10E,17-7C
-8
C020 0.1μF
C022 0.1μF
C024 0.1μF
C021 0.1μF
C023 0.1μF
C025 0.1μF
+8
-19
C013 6.8μF
7-7F,7-1F
E9
C014 6.8μF
+19
J007a
PNC10EA-90S-2.54DSA
J008a
PNC10EA-90S-2.54DSA
J009a
PNC10EA-90S-2.54DSA
+5V
L003
BNX-002
13A
14A
10A
12A
13B
14B
10B
12B
1A
2A
3A
4A
5A
1B
2B
3B
4B
5B
L017
L018
L019
L020
L021
B-02-R
+8
-8
+19
-19
CRTC
PIO
WSIF
A
B
C
D
E
50
F
G
0

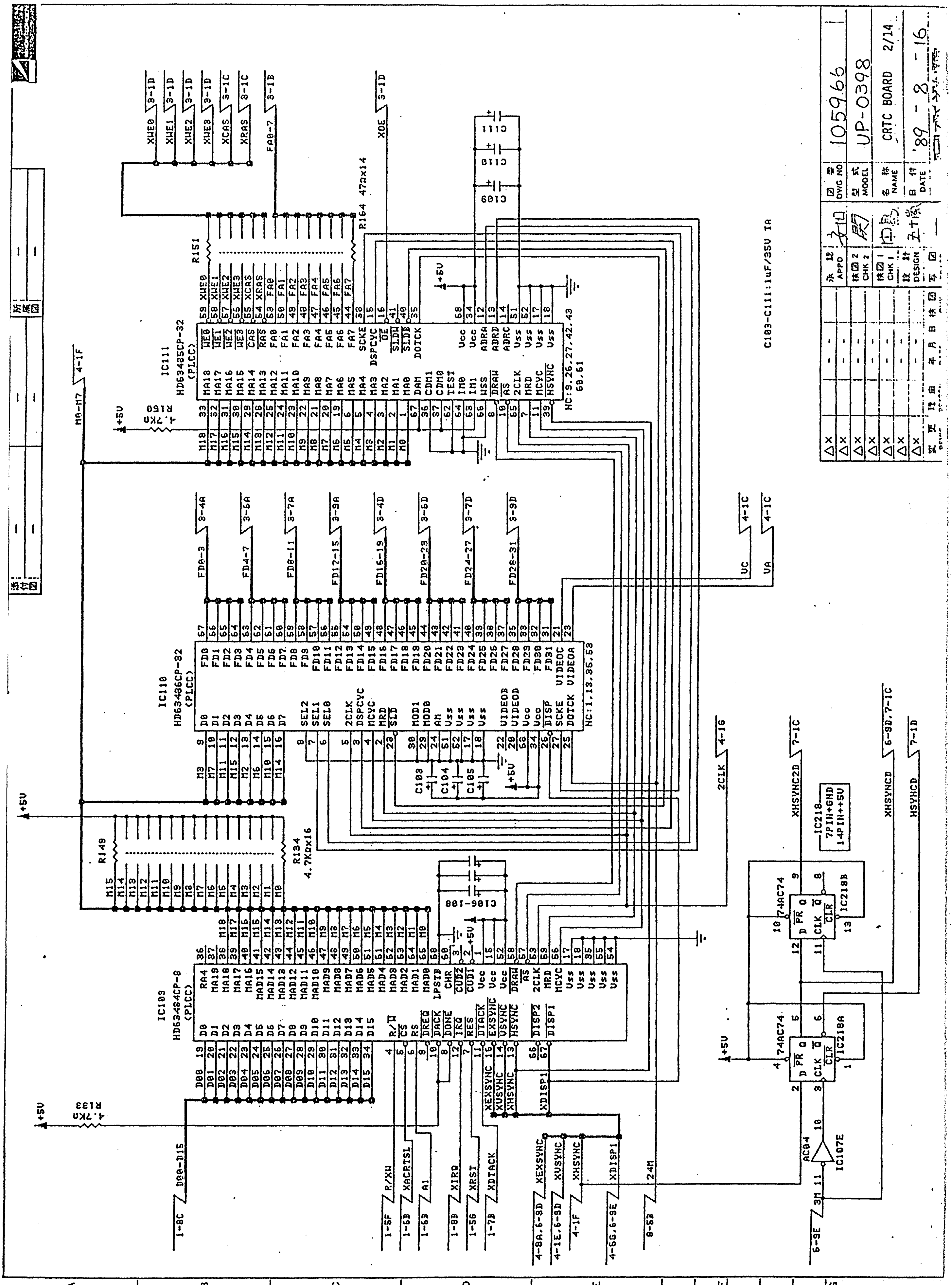
'89.11.1
日本光電
図面管理係

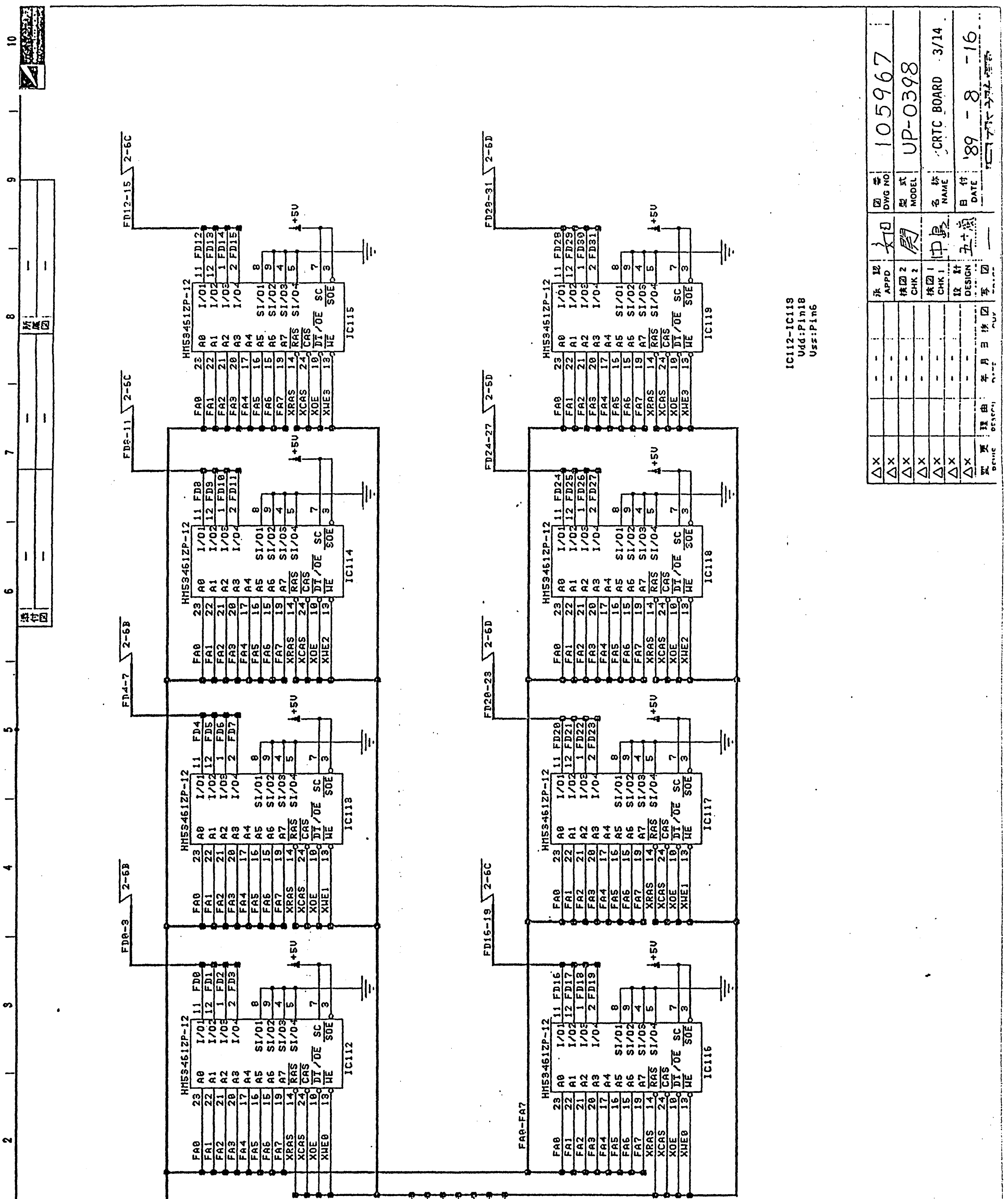
変更 REVIS	理由 REASON	年月日 DATE	検図 CHK				
△×		- -		承認 APPD		図番 DWG.NO	105963 B
△×		- -		検図2 CHK 2	関	型式 MODEL	up-0397
△×		- -		検図1 CHK 1	中島	名称 NAME	MAIN BOARD 19/19
△×		- -		設計 DESIGN	高橋	日付 DATE	89-8-16
△× 2	33	89-10-25	高橋	写図 TRACE	—		日本光電
△× 1	試作	89-8-16	高橋				


J101A
J101B
J101C
ADDRESS BUS
2-1F
DATA BUS
2-1A
A01 A02 A03 A04 A05 A06 A07 A08
A09 A10 A11 A12 A13 A14 A15 A16
A17 A18 A19 A20 A21 A22 A23
D00 D01 D02 D03 D04 D05 D06 D07
D08 D09 D10 D11 D12 D13 D14 D15
R001-R007
R008-R015
R016-R023
R031-R036
R039-R046
R071-R073
D001-D007
D008-D015
D016-D023
D031-D038
D039-D046
D071-D073
XINTR
R/XW
XAS
XRD
XROMSL1
XROMSL2
XROMSL3
XROMSL4
XROMSL5
XROMSL6
XROMSL1-5
AC138
IC011
AC10
IC013
AC04
IC012
C111 C112 C113 C114 C115 C116
0.1μF
+5V
OPEN
IC011
16PIN+5V
8PIN+E2
IC013.012
14PIN+5V
7PIN+E2
J101 TO MAIN
.... PC110EA-64P-2.54DS
R001-073 .... 47Ω
D001-073 .... 1SS-226
図番 DWG NO 105981
型式 MODEL UP-0520
名称 NAME ROM PACK 1/2
日付 DATE 89-8-15
承認 APPD
検図2 CHK2
検図1 CHK1
設計 DESIGN
写図 TRACE
変更 REVIS
理由 REASON
年月日 DATE
検図 CHK
A B C D E F G

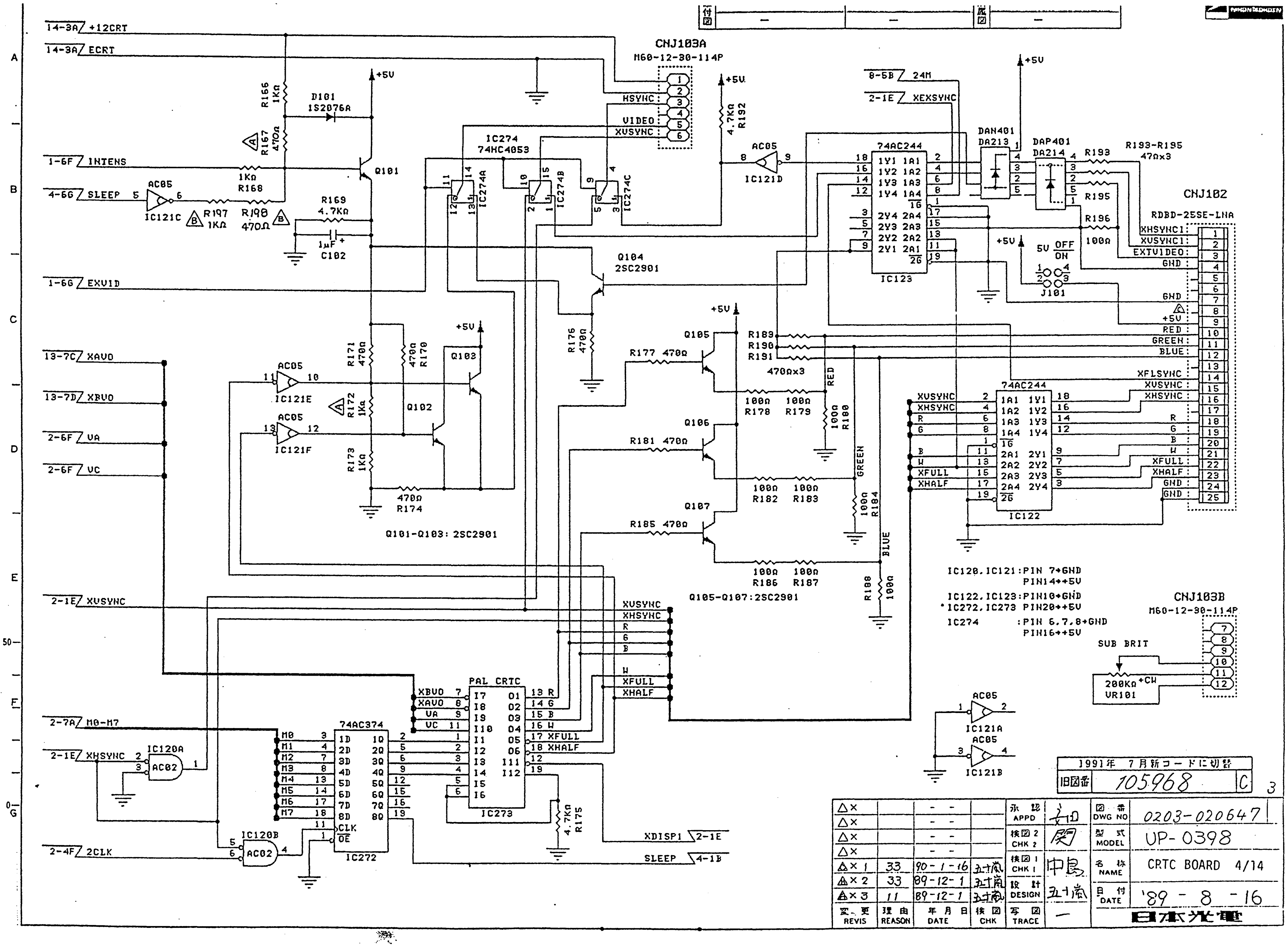

IC122
IC123
IC124
IC125
IC126
IC127
27C1024
IO15 IO14 IO13 IO12 IO11 IO10 IO09 IO08 IO07 IO06 IO05 IO04 IO03 IO02 IO01 IO00
D07 D06 D05 D04 D03 D02 D01 D00 D15 D14 D13 D12 D11 D10 D09 D08
CE
OE
XROMSL1
XROMSL2
XROMSL3
XROMSL4
XROMSL5
XRD
A15 A14 A13 A12 A11 A10 A09 A08 A07 A06 A05 A04 A03 A02 A01 A00
A16 A15 A14 A13 A12 A11 A10 A09 A08 A07 A06 A05 A04 A03 A02 A01
Vpp
PGM
NC
Vcc
Vss
+5V
DATA-BUS
XROMSL1-6
XRD
ADDRESS-BUS
1-6D
1-7F
1-7D
1-5A
A
B
C
D
E
F
G
50
0
図番 DWG NO 105982 A
型式 MODEL UP-0520
名称 NAME ROM PACK 2/2
日付 DATE 89-8-15
承認 APPD
検図2 CHK 2
検図1 CHK 1
設計 DESIGN
写図 TRACE
変更 REVIS
理由 REASON
年月日 DATE
検図 CHK
△× 1 追加 89-8-15

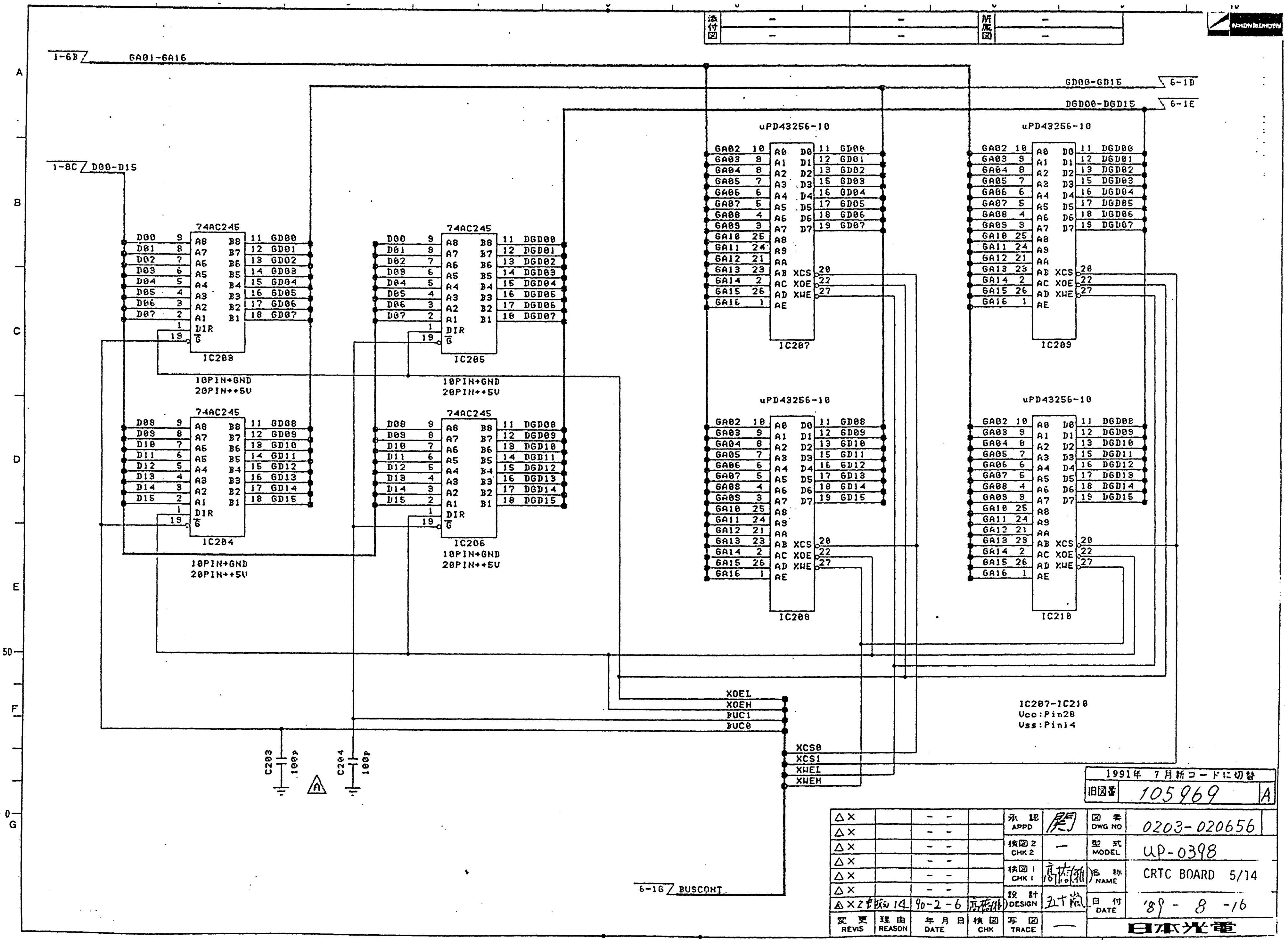

CRTC BOARD 1/14
UP-0398
0203-020671
105965
A
89-8-16
1991年 7月 新コードに切替
旧図番
CNJ101A
CNJ101B
CNJ101C
CNJ101D
PCN10EA-90P -2.54DS(05)
74AC244
74AC245
AC138
IC105
IC101
IC102
IC103
IC104A
IC104B
IC201
IC202
DA101 DAN803
DA102 DAP803
R101-R108 47Ω×8
R109-R116 47Ω×8
R117-R124 47Ω×8
R125-R130 47Ω×6
R201-R208 47Ω×8
R209-R216 47Ω×8
L101 BNX002-01
C101 6.8μF
IC106-108 Pin7:GND Pin14:+5V
IC105 Pin8:GND Pin16:+5V


IC109
HD63484CP-8
(PLCC)
IC110
HD63486CP-32
(PLCC)
IC111
HD63485CP-32
(PLCC)
NC:1,13,35,53
NC:9,26,27,42,43
60,61
R149
R134
4.7KΩx16
R151
R164 47Ωx14
R160
4.7KΩ
R133
4.7KΩ
C103-C111:1uF/35V TA
C106-108
C109
C110
C111
C103
C104
C105
74AC74
IC218A
IC218B
IC218
7PIN→GND
14PIN→+5V
AC04
IC107E
+5V
D00-D15
MA-M7
FD0-3
FD4-7
FD8-11
FD12-15
FD16-19
FD20-23
FD24-27
FD28-31
FA0-7
XWE0
XWE1
XWE2
XWE3
XCAS
XRAS
XOE
VC
VA
2CLK
XHSYNC2D
XHSYNCD
HSYNCD
R/XW
XACRTSL
A1
XIRQ
XRSI
XDTACK
XEXSYNC
XVSYNC
XHSYNC
XDISP1
24M
3M
1-8C
1-5F
1-6B
1-6B
1-8B
1-5G
1-7B
4-8A,6-9D
4-1E,6-9D
4-1F
4-6G,6-9E
8-5B
6-9E
4-1F
3-4A
3-6A
3-7A
3-9A
3-4D
3-6D
3-7D
3-9D
3-1D
3-1C
3-1B
4-1C
4-1G
7-1C
6-9D,7-1C
7-1D
DWG NO 105965
MODEL UP-0398
NAME CRTC BOARD 2/14
DATE '89-8-16
APPD
CHK 2
CHK 1
DESIGN
A
B
C
D
E
F
G



105967
UP-0398
CRTC BOARD 3/14
'89-8-16
HM534612P-12
IC112
IC113
IC114
IC115
IC116
IC117
IC118
IC119
IC112-IC119
Vdd:Pin18
Vss:Pin6
FA0-7
2-10C
FA0-FA7
XRAS
XCAS
XOE
XWE0
XWE1
XWE2
XWE3
2-10B
2-9C
2-9B
FD0-3
FD4-7
FD8-11
FD12-15
FD16-19
FD20-23
FD24-27
FD28-31
2-6B
2-6C
2-6D
2-5D
+5V


CNJ103A
M60-12-30-114P
HSYNC
VIDEO
XUSYNC
14-3A +12CRT
14-3A ECRT
1-6F INTENS
4-6G SLEEP
1-6G EXVID
13-7C XAVD
13-7D XBVD
2-6F VA
2-6F VC
2-1E XVSYNC
2-7A M0-M7
2-1E XHSYNC
2-4F 2CLK
D101 1S2076A
R166 1KΩ
R167 470Ω
R168 1KΩ
R197 1KΩ
R198 470Ω
R169 4.7KΩ
1μF C102
Q101
AC05 IC121C
IC274 74HC4053
IC274A
IC274B
IC274C
Q104 2SC2901
R176 470Ω
R171 470Ω
R170 470Ω
R172 1KΩ
R173 1KΩ
R174 470Ω
Q102
Q103
AC05 IC121E
AC05 IC121F
Q101-Q103: 2SC2901
R192 4.7KΩ
AC05 IC121D
8-5B 24M
2-1E XEXSYNC
74AC244 IC123
DAN401 DA213
DAP401 DA214
R193
R193-R195 47Ω×3
R195
R196 100Ω
5V OFF ON
J101
CNJ102
RDBD-25SE-LNA
XHSYNC1
XUSYNC1
EXTVIDEO
GND
+5V
RED
GREEN
BLUE
XFLSYNC
XUSYNC
XHSYNC
R
G
B
W
XFULL
XHALF
R189
R190
R191
470Ω×3
Q105
Q106
Q107
R177 470Ω
R181 470Ω
R185 470Ω
100Ω R178
100Ω R179
100Ω R180
100Ω R182
100Ω R183
100Ω R184
100Ω R186
100Ω R187
100Ω R188
Q105-Q107: 2SC2901
74AC244 IC122
IC120, IC121: PIN 7→GND PIN14→+5V
IC122, IC123: PIN10→GND
IC272, IC273 PIN20→+5V
IC274 : PIN 6,7,8→GND PIN16→+5V
CNJ103B
M60-12-30-114P
SUB BRIT
200KΩ +CW VR101
AC05 IC121A
AC05 IC121B
PAL CRTC IC273
R175 4.7KΩ
XDISP1 2-1E
SLEEP 4-1B
74AC374 IC272
IC120A AC02
IC120B AC02
1991年 7月新コードに切替
旧図番 105968 C
3
0203-020647
UP-0398
CRTC BOARD 4/14
'89 - 8 - 16
日本光電
承認 APPD
検図2 CHK 2
検図1 CHK 1
設計 DESIGN
写図 TRACE
図番 DWG NO
型式 MODEL
名称 NAME
日付 DATE
変更 REVIS
理由 REASON
年月日 DATE
検図 CHK
×1 33 90-1-16
×2 33 89-12-1
×3 11 89-12-1


1-6B
GA01-GA16
1-8C
D00-D15
GD00-GD15
6-1D
DGD00-DGD15
6-1E
74AC245
IC203
IC204
IC205
IC206
10PIN+GND
20PIN++5V
uPD43256-10
IC207
IC208
IC209
IC210
A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 AA AB AC AD AE
D0 D1 D2 D3 D4 D5 D6 D7
XCS XOE XWE
A8 A7 A6 A5 A4 A3 A2 A1 DIR G
B8 B7 B6 B5 B4 B3 B2 B1
XOEL
XOEH
BUC1
BUC0
XCS0
XCS1
XWEL
XWEH
6-1G
BUSCONT
C203
C204
100p
IC207-IC210
Vcc:Pin28
Vss:Pin14
A
B
C
D
E
F
G
50
0

添付図 — — —

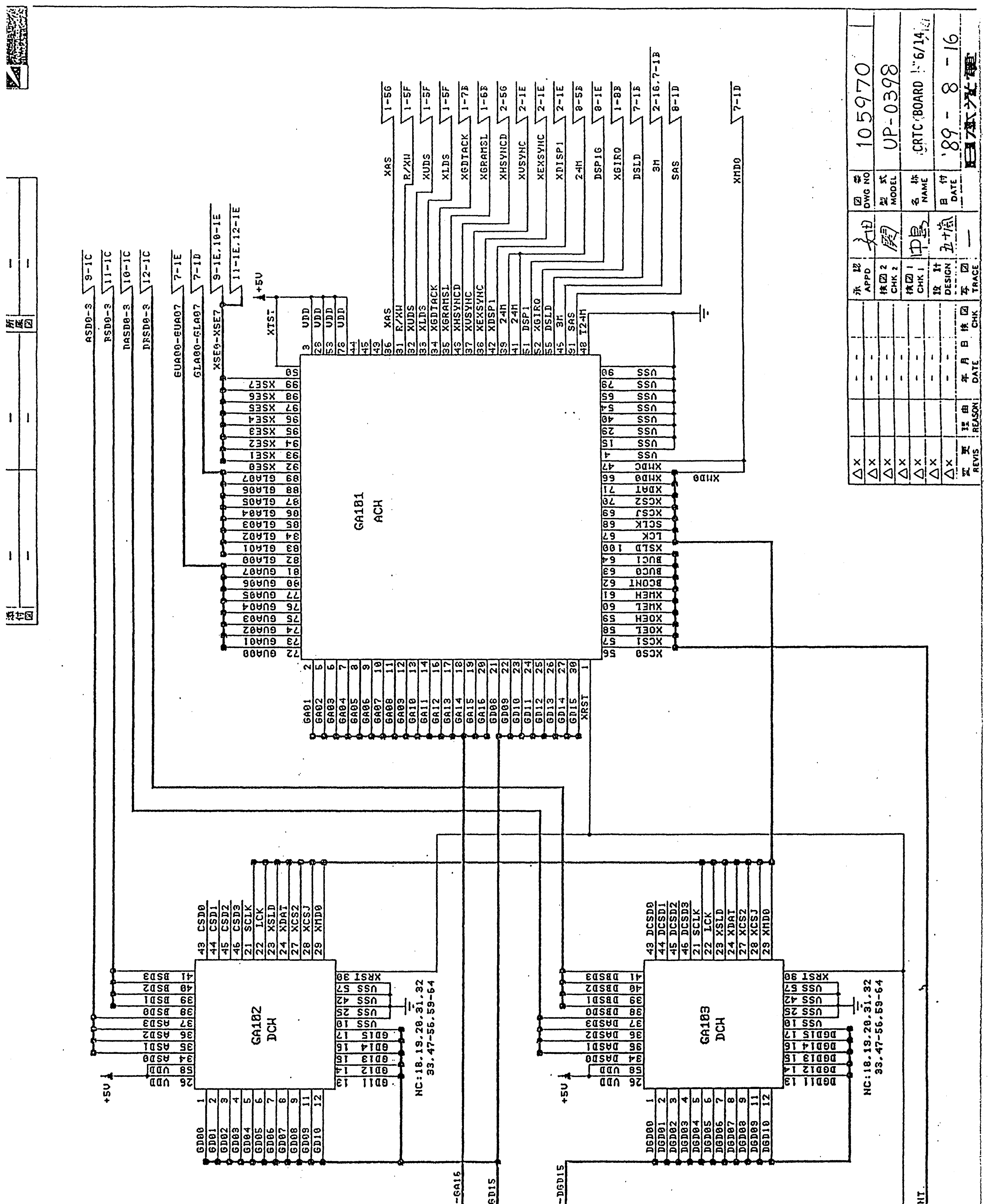
所属図 —

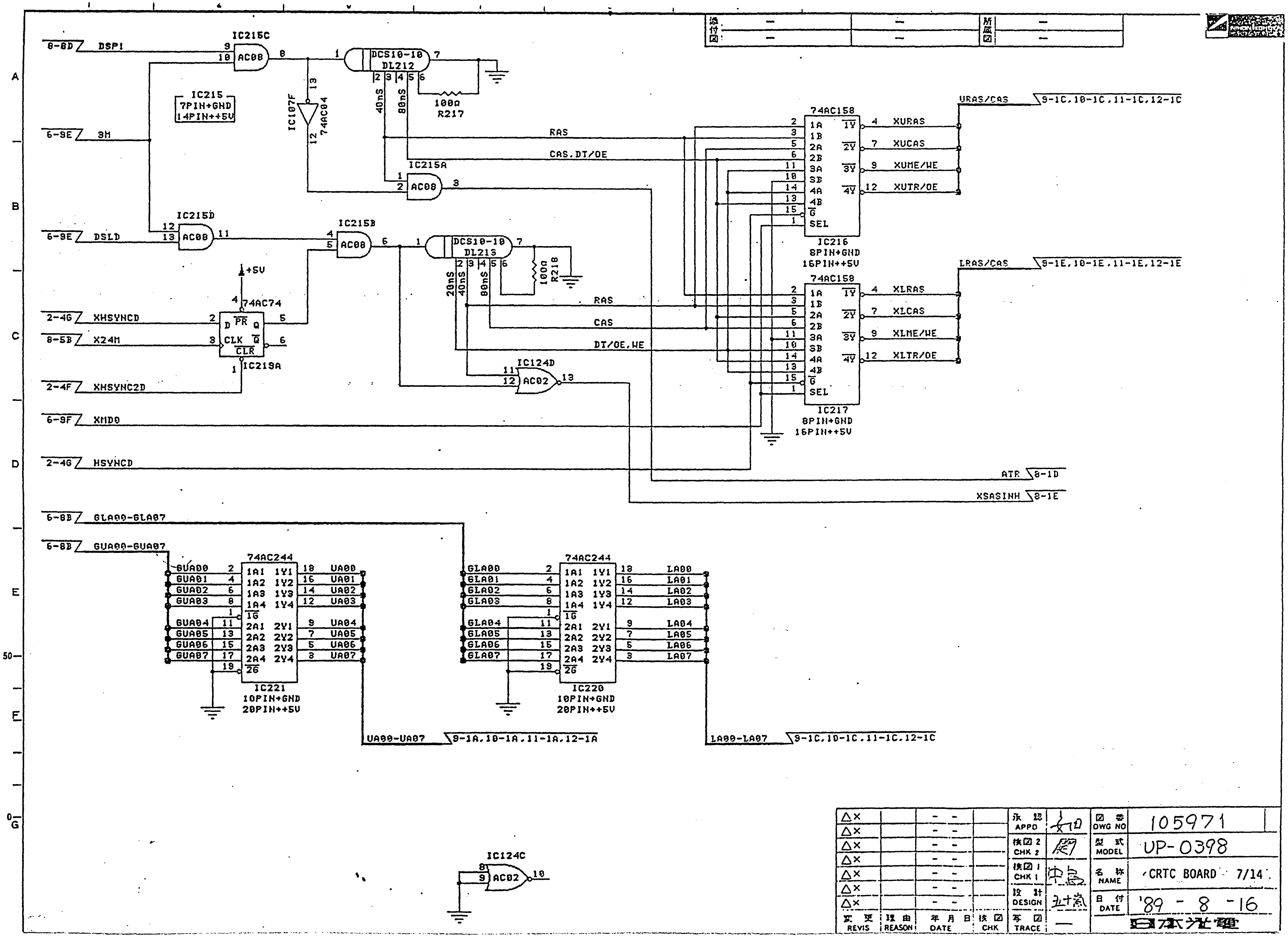
1991年 7月新コードに切替

旧図番 105969 A

変更 REVIS	理由 REASON	年月日 DATE	検図 CHK
△×		- -	
△×		- -	
△×		- -	
△×		- -	
△×		- -	
△×		- -	
⚠×Z世版14		90-2-6	高橋(修)

承認 APPD	関	図番 DWG NO	0203-020656
検図2 CHK 2	—	型式 MODEL	UP-0398
検図1 CHK 1	高橋(修)	名称 NAME	CRTC BOARD 5/14
設計 DESIGN	五十嵐	日付 DATE	'89 - 8 - 16
写図 TRACE	—		日本光電


GA101
ACH
GA102
DCH
GA103
DCH
RSD0-3 9-1C
RSD0-3 11-1C
DASD0-3 10-1C
DRSD0-3 12-1C
GUA00-GUA07 7-1E
GLA00-GLA07 7-1D
XSE0-XSE7 9-1E,10-1E
11-1E,12-1E
+5V
XTST
XAS 1-5G
R/XW 1-5F
XUDS 1-5F
XLDS 1-5F
XGDTACK 1-7B
XGRAMSL 1-6B
XHSYNCD 2-5G
XVSYNC 2-1E
XEXSYNC 2-1E
XDISP1 2-1E
24M 8-5B
DSP16 8-1E
XGIRQ 1-8B
DSLD 7-1B
3M 2-16,7-1B
SAS 8-1D
XHD0 7-1D
GA01-GA16
GD00-GD15
DGD00-DGD15
1-6C
5-9A
1-5G XRST
1-5F,5-5G BUSCONT
NC:18,19,20,31,32
33,47-56,59-64
105970
UP-0398
CRTC BOARD
'89-8-16
図番 DWG NO
型式 MODEL
名称 NAME
日付 DATE
承認 APPD
検図2 CHK 2
検図1 CHK 1
設計 DESIGN
写図 TRACE
A
B
C
D
E
F
G



8-8D DSP1
6-9E 3H
6-9E DSLD
2-4G XHSYNCD
8-5B X24M
2-4F XHSYNC2D
6-9F XMD0
2-4G HSYNCD
6-8B GLA00-GLA07
6-8B GUA00-GUA07
IC215C AC08
IC215 7PIN+GND 14PIN++5V
IC107F 74AC04
DCS10-10 DL212
40nS 80nS
100Ω R217
IC215A AC08
IC215D AC08
IC215B AC08
+5V
74AC74 IC219A
D PR Q CLK Q CLR
DCS10-10 DL213
20nS 40nS 80nS
100Ω R218
IC124D AC02
RAS
CAS.DT/OE
RAS
CAS
DT/OE,WE
74AC158 IC216 8PIN+GND 16PIN++5V
74AC158 IC217 8PIN+GND 16PIN++5V
1A 1B 2A 2B 3A 3B 4A 4B G SEL 1Y 2Y 3Y 4Y
XURAS XUCAS XUME/WE XUTR/OE
URAS/CAS 9-1C,10-1C,11-1C,12-1C
XLRAS XLCAS XLME/WE XLTR/OE
LRAS/CAS 9-1E,10-1E,11-1E,12-1E
ATR 8-1D
XSASINH 8-1E
74AC244 IC221 10PIN+GND 20PIN++5V
GUA00 GUA01 GUA02 GUA03 GUA04 GUA05 GUA06 GUA07
UA00 UA01 UA02 UA03 UA04 UA05 UA06 UA07
UA00-UA07 9-1A,10-1A,11-1A,12-1A
74AC244 IC220 10PIN+GND 20PIN++5V
GLA00 GLA01 GLA02 GLA03 GLA04 GLA05 GLA06 GLA07
LA00 LA01 LA02 LA03 LA04 LA05 LA06 LA07
LA00-LA07 9-1C,10-1C,11-1C,12-1C
IC124C AC02
A B C D E F G
50

図番 DWG NO 105971

型式 MODEL UP-0398

名称 NAME CRTC BOARD 7/14

日付 DATE '89 - 8 - 16

承認 APPO

検図 2 CHK 2

検図 1 CHK 1

設計 DESIGN

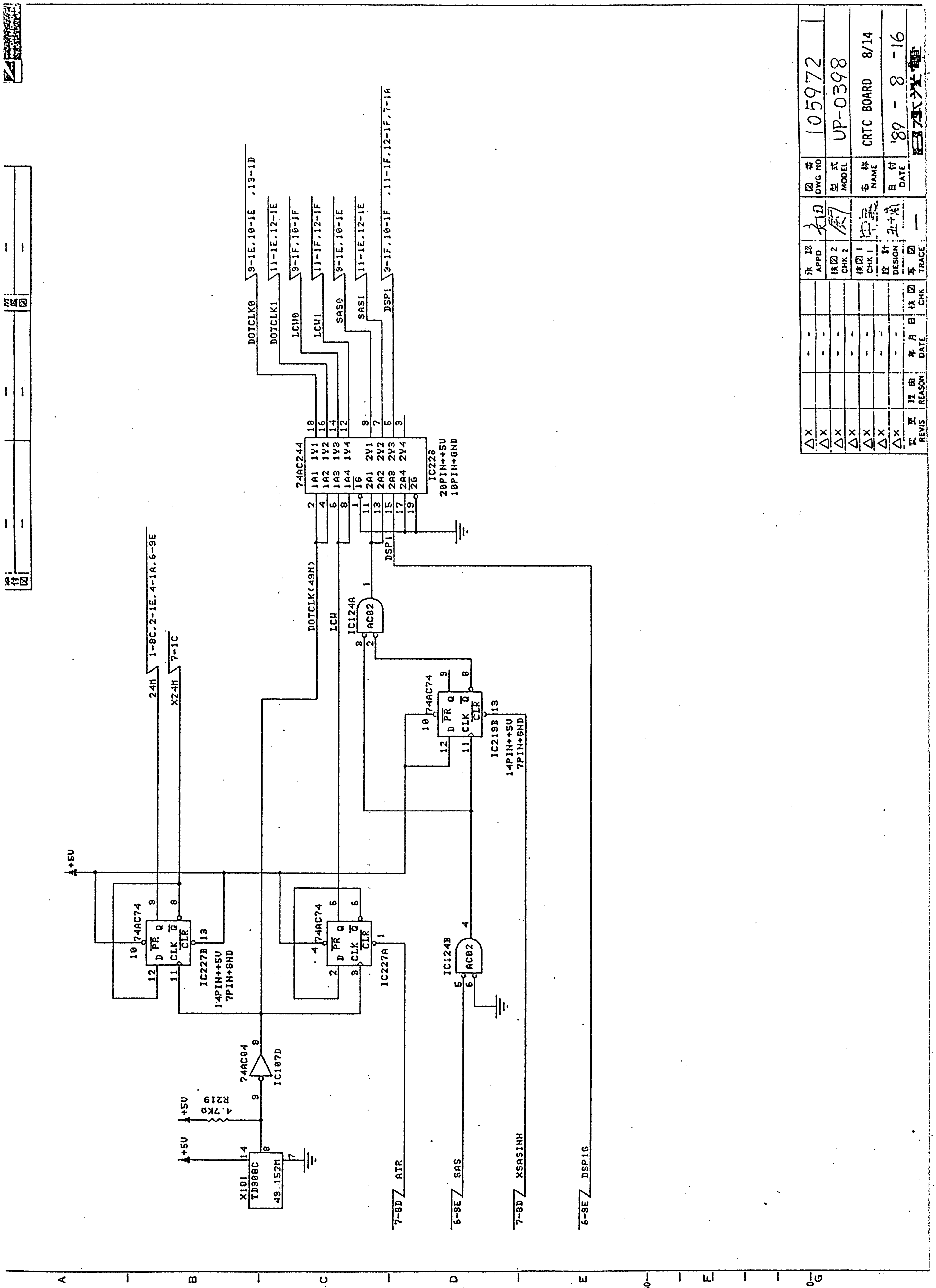
写図 TRACE —

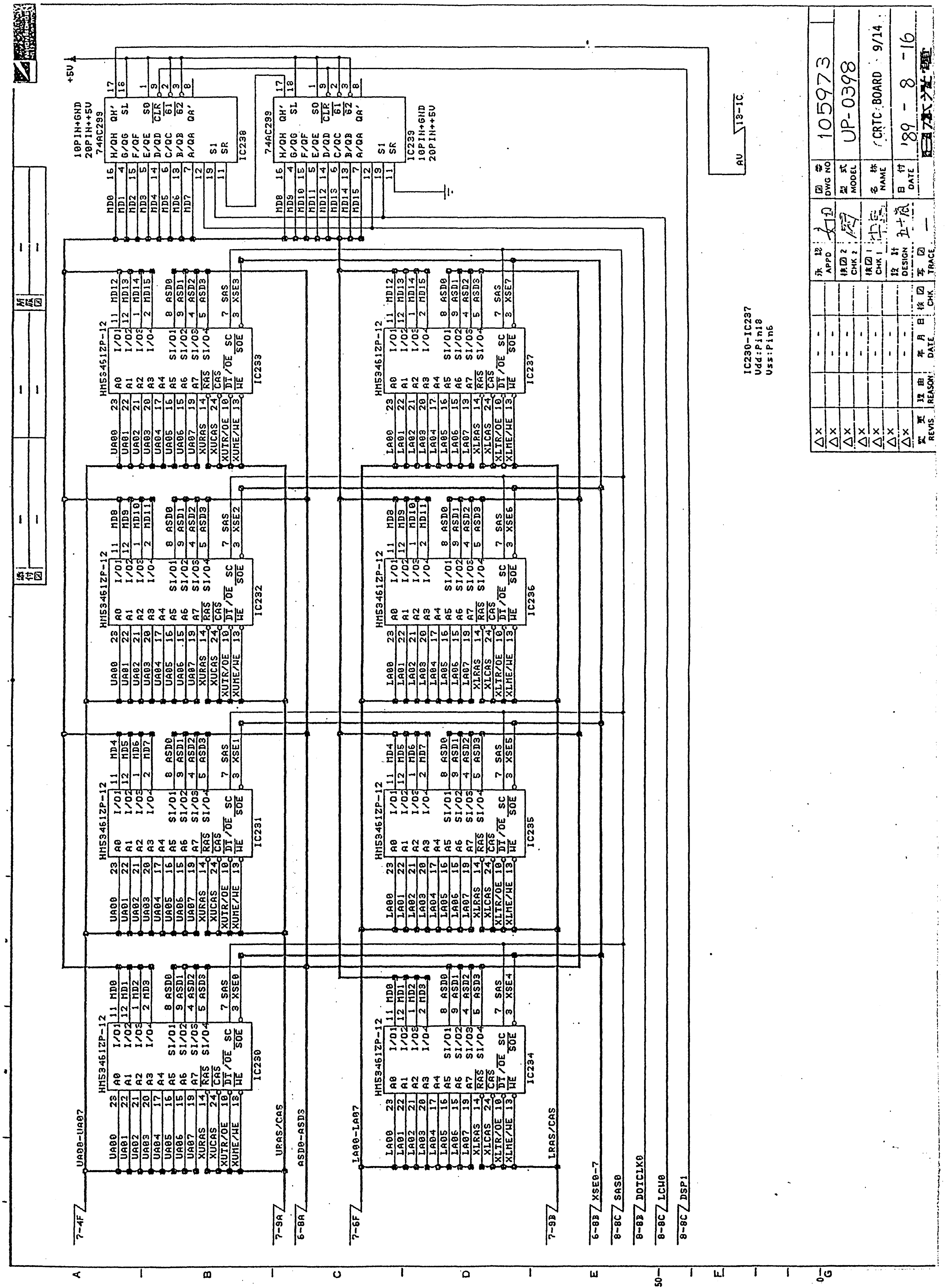
変更 REVIS

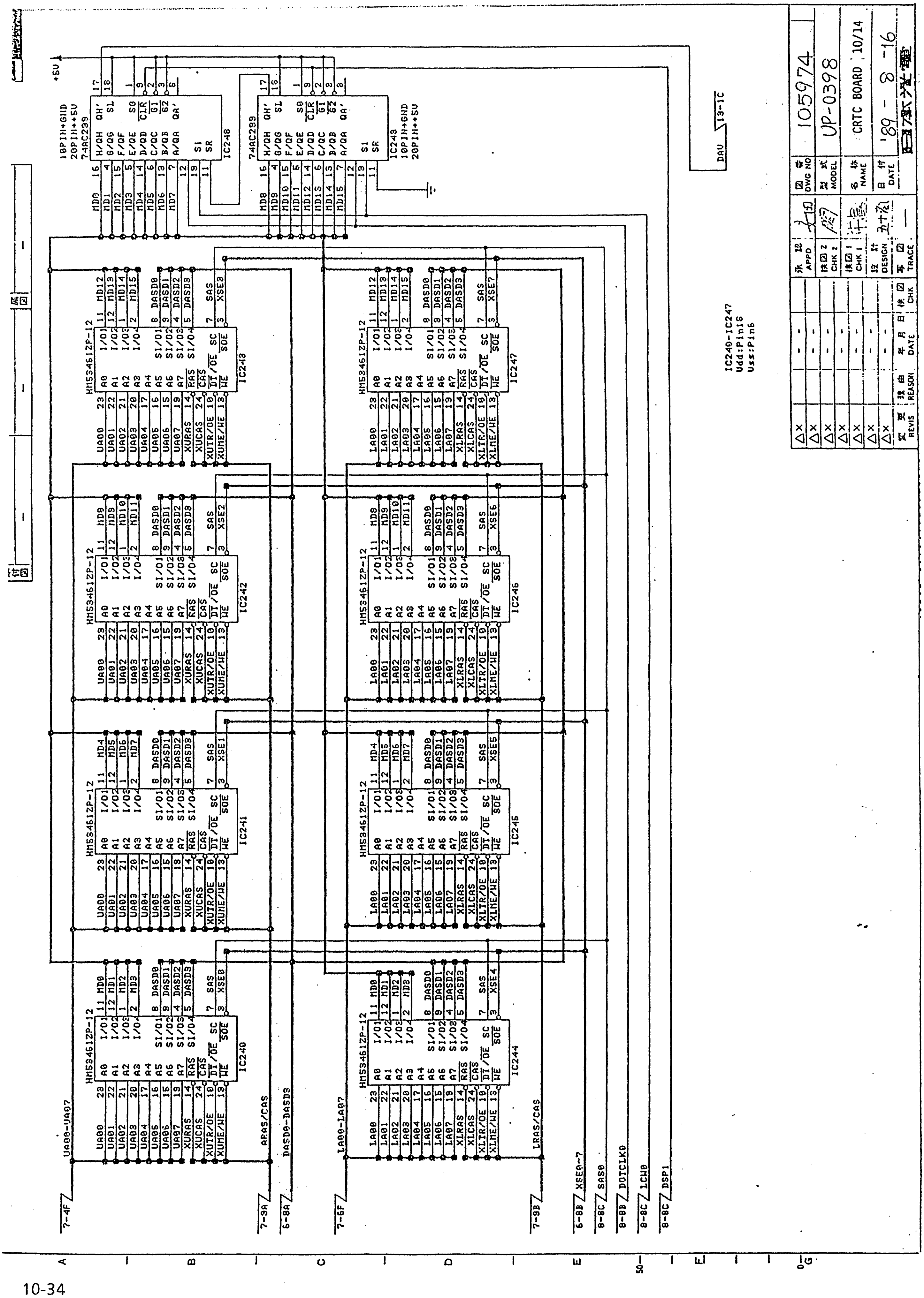
理由 REASON

年月日 DATE

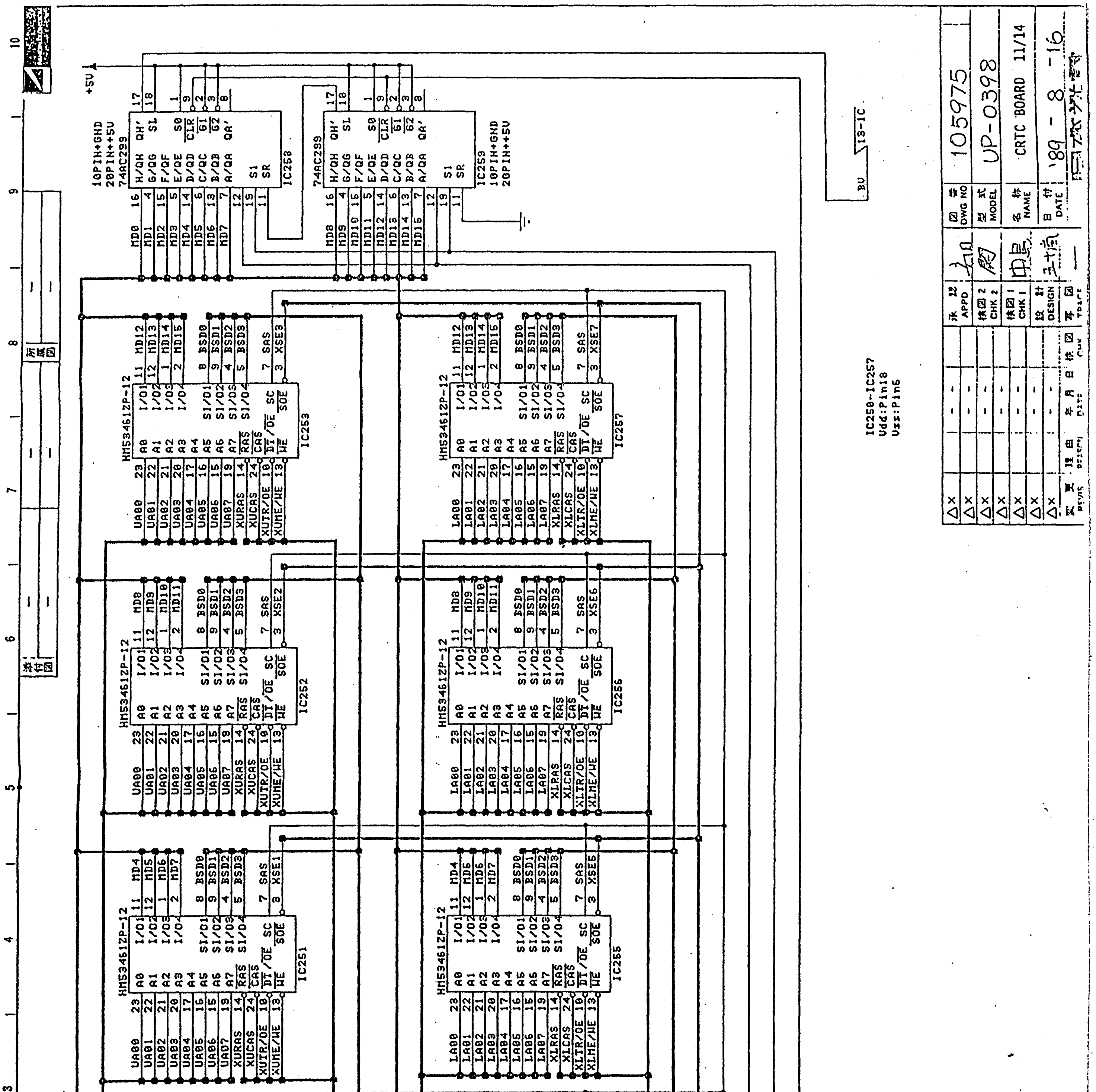
検図 CHK

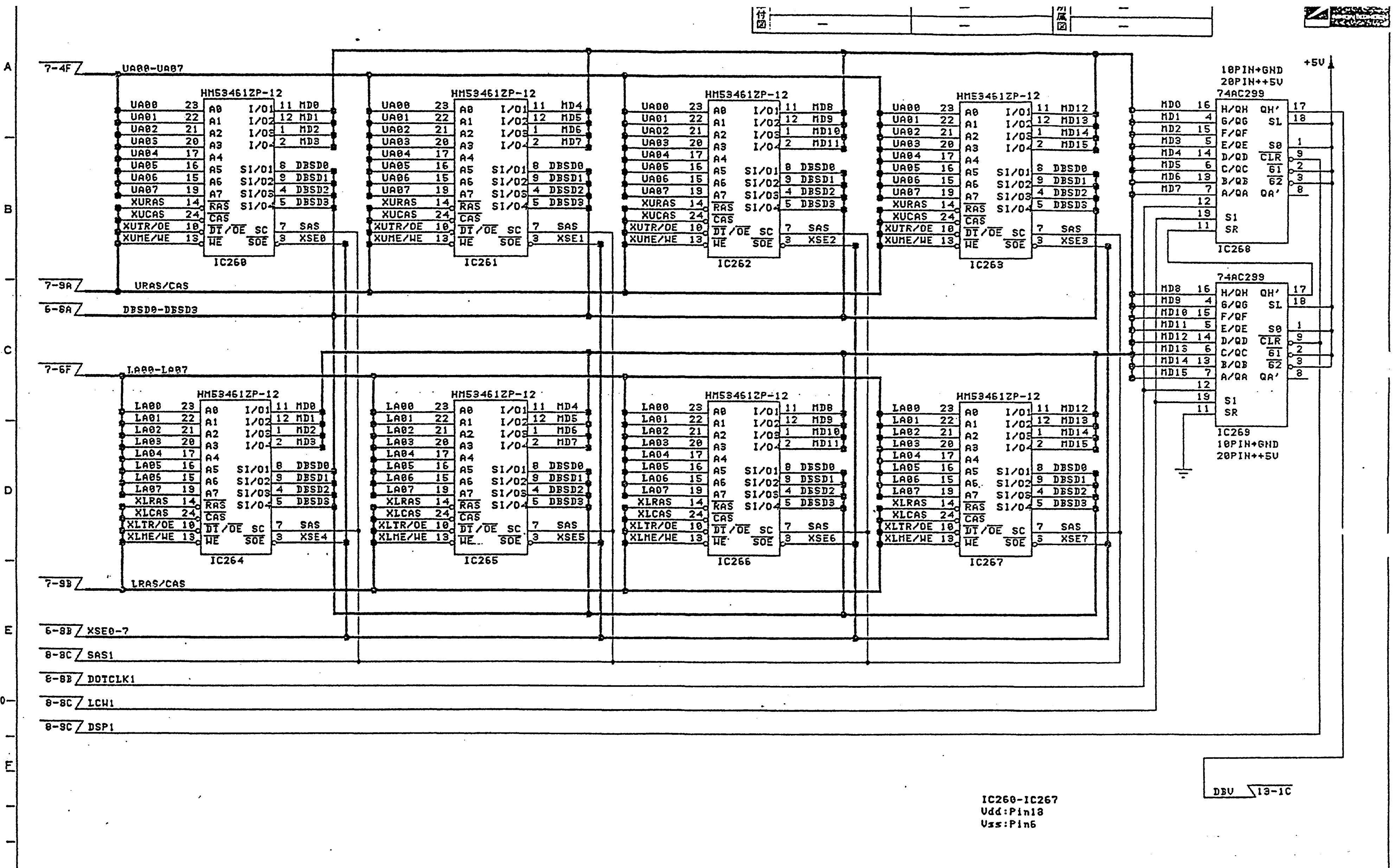

X101
TD308C
49.152M
+5V
R219
4.7KΩ
74AC04
IC107D
74AC74
IC227B
14PIN+5V
7PIN+GND
IC227A
24M
1-8C,2-1E,4-1A,6-9E
X24M
7-1C
DOTCLK(49M)
LCH
IC124A
AC02
IC124B
74AC74
IC219B
14PIN+5V
7PIN+GND
74AC244
IC226
20PIN+5V
10PIN+GND
DOTCLK0
9-1E,10-1E ,13-1D
DOTCLK1
11-1E,12-1E
LCH0
9-1F,10-1F
LCH1
11-1F,12-1F
SAS0
9-1E,10-1E
SAS1
11-1E,12-1E
DSP1
9-1F,10-1F ,11-1F,12-1F,7-1A
ATR
7-8D
SAS
6-9E
XSASINH
7-6D
DSP16
6-9E
A
B
C
D
E
F
G
DWG NO
105972
MODEL
UP-0398
NAME
CRTC BOARD 8/14
DATE
'89 - 8 - 16
APPD
CHK 2
CHK 1
DESIGN
TRACE
REVIS
REASON
DATE
CHK


+5V
IC238
74AC299
10PIN+GND
20PIN++5V
IC239
IC230
IC231
IC232
IC233
IC234
IC235
IC236
IC237
HM53461ZP-12
IC230-IC237
Vdd:Pin18
Vss:Pin6
UA00-UA07
LA00-LA07
URAS/CAS
LRAS/CAS
ASD0-ASD3
XSE0-7
SAS0
DOTCLK0
LCH0
DSP1
AV
13-IC
7-4F
7-9A
6-8A
7-6F
7-9B
6-8B
8-8C
8-8B
8-8C
8-8C
105973
UP-0398
CRTC BOARD 9/14
'89-8-16
DWG NO
MODEL
NAME
DATE
APPD
CHK 2
CHK 1
DESIGN
TRACE
REVIS
REASON
DATE
CHK
A
B
C
D
E
F
G



105974
UP-0398
CRTC BOARD 10/14
'89 - 8 - 16
DWG NO
MODEL
NAME
DATE
APPD
CHK 2
CHK 1
DESIGN
TRACE
REVIS
REASON
DATE
CHK
IC240-IC247
Udd:Pin16
Uss:Pin6
HM53461ZP-12
IC240
IC241
IC242
IC243
IC244
IC245
IC246
IC247
IC248
74AC299
10PIN+GND
20PIN++5V
+5V
DAV
13-1C
UA00-UA07
LA00-LA07
ARAS/CAS
LRAS/CAS
DASD0-DASD3
XSE0-7
SAS0
DOTCLK0
LCH0
DSP1
7-4F
7-9A
6-8A
7-6F
7-9B
6-8B
8-8C
8-8B
8-8C
8-8C
A
B
C
D
E
F
G

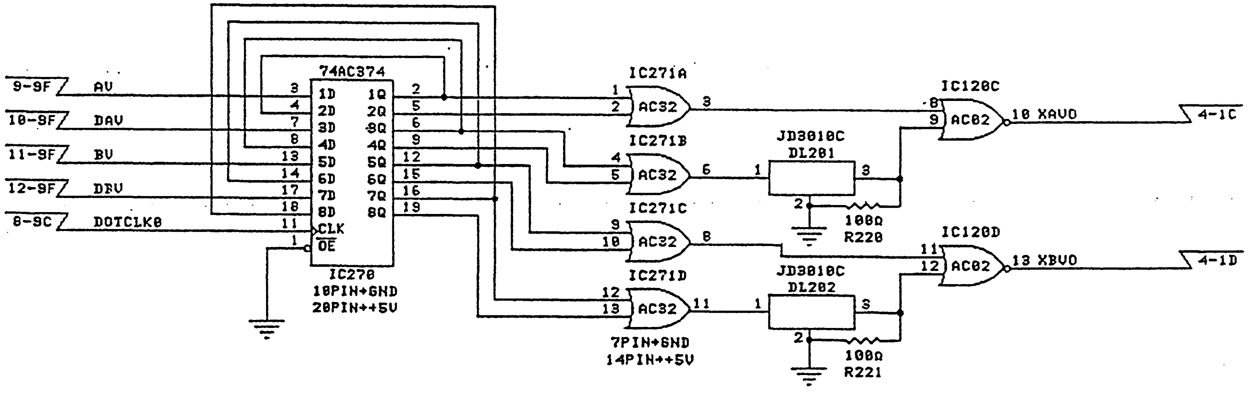

105975
UP-0398
CRTC BOARD 11/14
'89 - 8 - 16
DWG NO
MODEL
NAME
DATE
APPD
CHK 2
CHK 1
DESIGN
HM53461ZP-12
IC250
IC251
IC252
IC253
IC254
IC255
IC256
IC257
74AC299
IC258
IC259
10PIN+GND
20PIN++5V
+5V
IC250-IC257
Vdd:Pin18
Vss:Pin6
UA00-UA07
URAS/CAS
BSD0-BSD3
LA00-LA07
LRAS/CAS
XSE0-7
SAS1
DOTCLK1
LCH1
DSP1
BU
13-1C
7-4F
7-9A
6-8A
7-6F
7-9B
6-8B
8-8C
8-8B
8-8C
8-8C
MD0
MD1
MD2
MD3
MD4
MD5
MD6
MD7
MD8
MD9
MD10
MD11
MD12
MD13
MD14
MD15
XURAS
XUCAS
XUTR/OE
XUME/WE
XLRAS
XLCAS
XLTR/OE
XLME/WE
SAS
XSE0
XSE1
XSE2
XSE3
XSE4
XSE5
XSE6
XSE7


7-4F
UA00-UA07
7-9A
URAS/CAS
6-8A
DBSD0-DBSD3
7-6F
LA00-LA07
7-9B
LRAS/CAS
6-8B
XSE0-7
8-8C
SAS1
8-8B
DOTCLK1
8-8C
LCH1
8-9C
DSP1
HM53461ZP-12
IC260
IC261
IC262
IC263
IC264
IC265
IC266
IC267
A0
A1
A2
A3
A4
A5
A6
A7
RAS
CAS
DT/OE
WE
I/O1
I/O2
I/O3
I/O4
SI/O1
SI/O2
SI/O3
SI/O4
SC
SOE
SAS
XSE0
XSE1
XSE2
XSE3
XSE4
XSE5
XSE6
XSE7
XURAS
XUCAS
XUTR/OE
XUME/WE
XLRAS
XLCAS
XLTR/OE
XLME/WE
MD0
MD1
MD2
MD3
MD4
MD5
MD6
MD7
MD8
MD9
MD10
MD11
MD12
MD13
MD14
MD15
DBSD0
DBSD1
DBSD2
DBSD3
74AC299
IC268
IC269
10PIN+GND
20PIN++5V
H/QH
G/QG
F/QF
E/QE
D/QD
C/QC
B/QB
A/QA
QH'
QA'
S0
S1
SR
SL
CLR
G1
G2
+5V
DBV
13-1C

IC260-IC267
Vdd:Pin18
Vss:Pin6

変更 REVIS	理由 REASON	年月日 DATE	検図 CHK
△×		- -	
△×		- -	
△×		- -	
△×		- -	
△×		- -	
△×		- -	

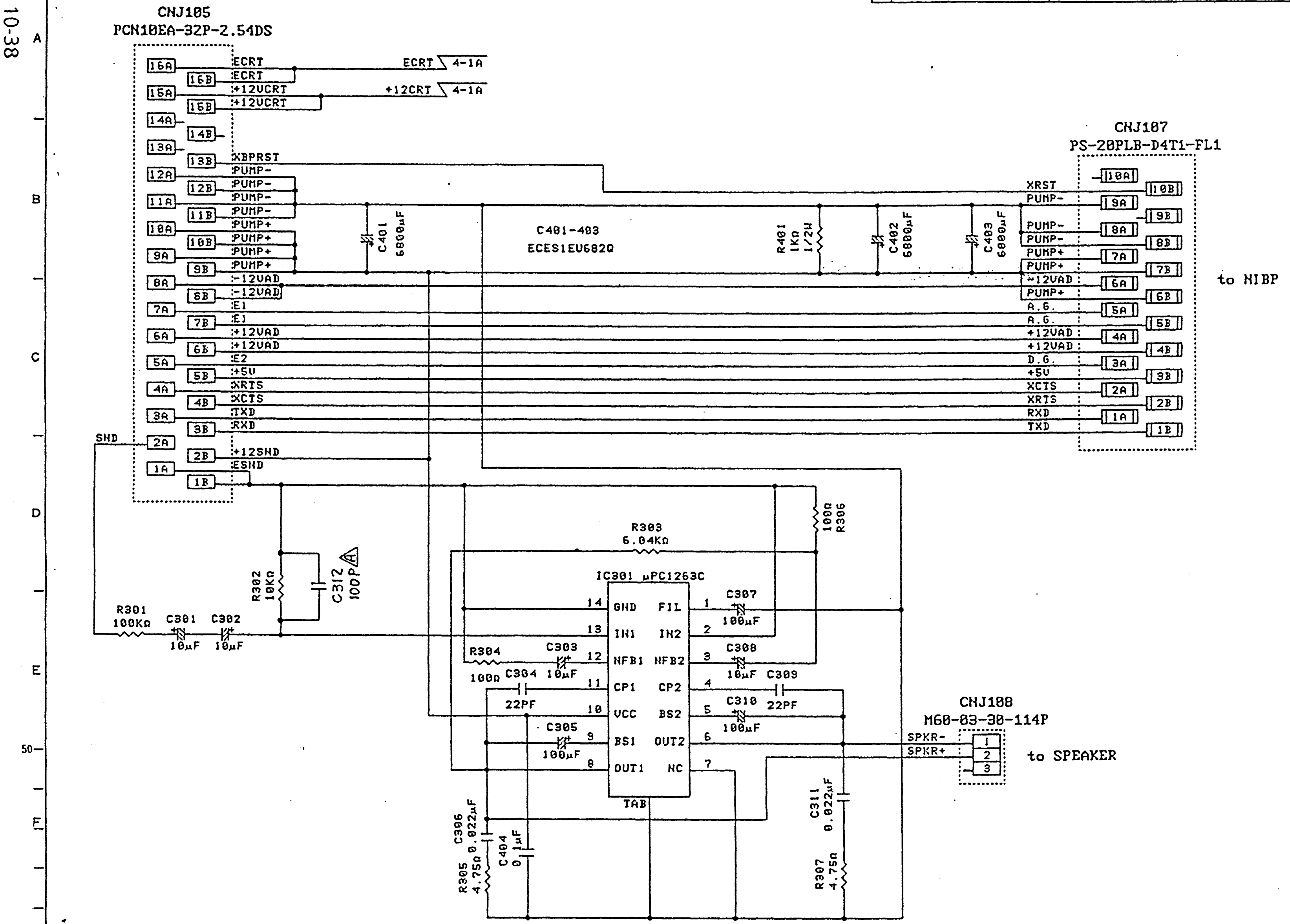
承認 APPD		図番 DWG NO	105976
検図2 CHK 2		型式 MODEL	UP-0398
検図1 CHK 1	中島	名称 NAME	CRTC BOARD 12/14
設計 DESIGN	五十嵐	日付 DATE	'89 - 8 - 14
写図 TRACE	—		


9-9F
AV
10-9F
DAV
11-9F
BV
12-9F
DBV
8-9C
DOTCLK0
74AC374
1D
2D
3D
4D
5D
6D
7D
8D
CLK
OE
1Q
2Q
3Q
4Q
5Q
6Q
7Q
8Q
IC270
10PIN→GND
20PIN→+5V
IC271A
AC32
IC271B
AC32
IC271C
AC32
IC271D
AC32
7PIN→GND
14PIN→+5V
JD3010C
DL201
JD3010C
DL202
100Ω
R220
100Ω
R221
IC120C
AC02
10 XAVO
IC120D
AC02
13 XBVO
4-1C
4-1D

3

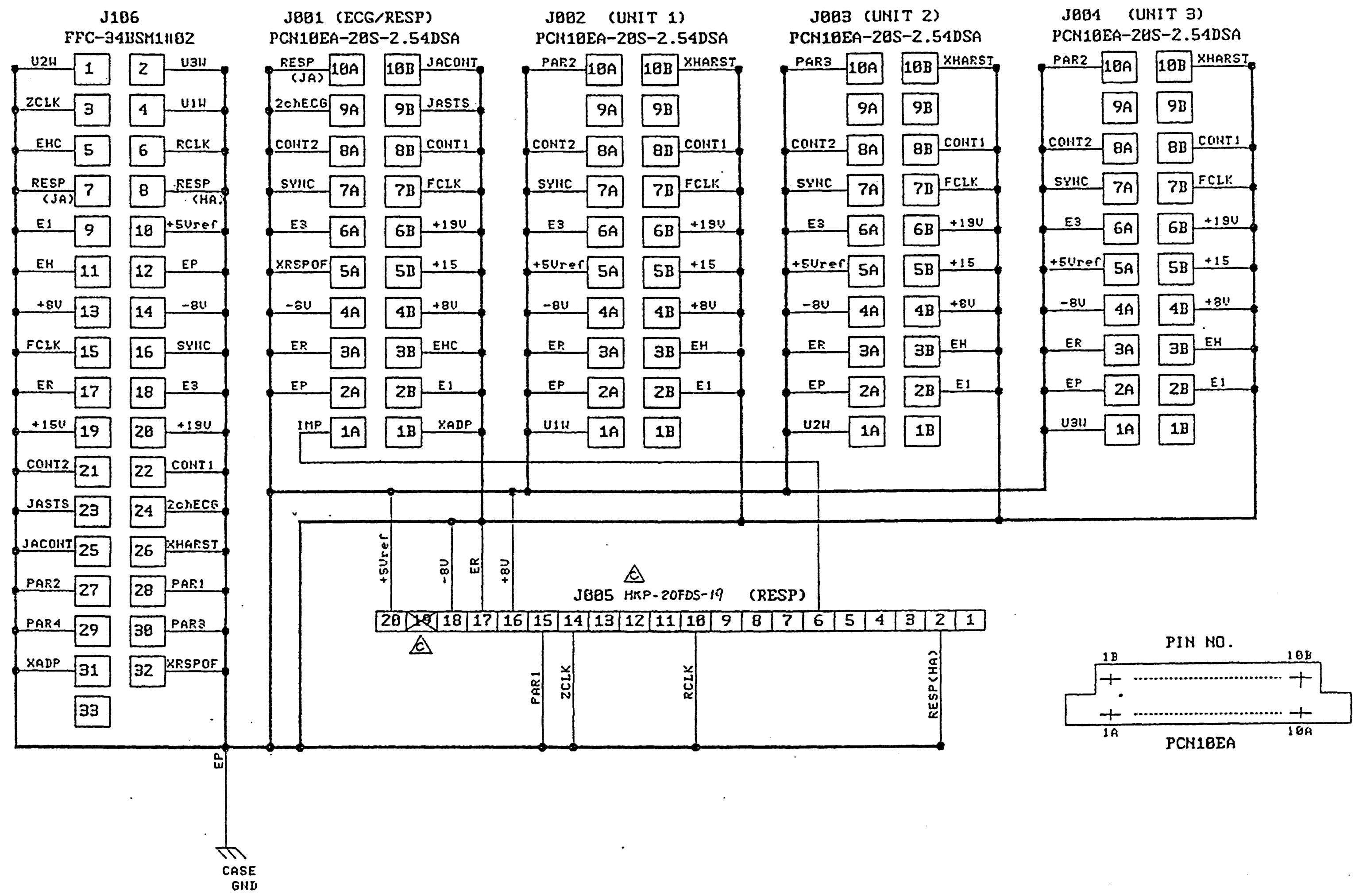
△×		- -		承認 APPD		図番 DWG NO	105977
△×		- -		検図2 CHK 2	関	型式 MODEL	UP-0398
△×		- -		検図1 CHK 1	中島	名称 NAME	CRTC BOARD 13/14
△×		- -		設計 DESIGN		日付 DATE	'89 - 8 -16
△×		- -					
△×		- -					
△×		- -					
変更 REVIS	理由 REASON	年月日 DATE	検図 CHK	写図 TRACE	—	日本光電	

添付図	—	—	所属図	—	—


A
B
C
D
E
50
F
0
G
CNJ105
PCN10EA-32P-2.54DS
16A
16B
15A
15B
14A
14B
13A
13B
12A
12B
11A
11B
10A
10B
9A
9B
8A
8B
7A
7B
6A
6B
5A
5B
4A
4B
3A
3B
2A
2B
1A
1B
ECRT
ECRT
+12VCRT
+12VCRT
XBPRST
PUMP-
PUMP-
PUMP-
PUMP-
PUMP+
PUMP+
PUMP+
PUMP+
-12VAD
-12VAD
E1
E1
+12VAD
+12VAD
E2
+5V
XRTS
XCTS
TXD
RXD
+12SND
ESND
SND
ECRT 4-1A
+12CRT 4-1A
C401
6800μF
C401-403
ECES1EV682Q
R401
1KΩ
1/2W
C402
6800μF
C403
6800μF
CNJ107
PS-20PLB-D4T1-FL1
XRST
PUMP-
PUMP-
PUMP-
PUMP+
PUMP+
-12VAD
PUMP+
A.G.
A.G.
+12VAD
+12VAD
D.G.
+5V
XCTS
XRTS
RXD
TXD
10A
10B
9A
9B
8A
8B
7A
7B
6A
6B
5A
5B
4A
4B
3A
3B
2A
2B
1A
1B
to NIBP
R303
6.04KΩ
100Ω
R306
R302
10KΩ
C312
100P
A
R301
100KΩ
C301
10μF
C302
10μF
IC301 μPC1263C
14 GND
13 IN1
12 NFB1
11 CP1
10 VCC
9 BS1
8 OUT1
1 FIL
2 IN2
3 NFB2
4 CP2
5 BS2
6 OUT2
7 NC
TAB
C307
100μF
C308
10μF
C309
22PF
C310
100μF
R304
100Ω
C303
10μF
C304
22PF
C305
100μF
CNJ108
M60-03-30-114P
SPKR-
SPKR+
1
2
3
to SPEAKER
C306
0.022μF
R305
4.75Ω
C404
0.1μF
C311
0.022μF
R307
4.75Ω

1991年 7月新コードに切替			
旧図番	105978	A	3

変更 REVIS	理由 REASON	年月日 DATE	検図 CHK				
△×		- -		承認 APPD	太田	図番 DWG NO	0203-020745
△×		- -		検図2 CHK2	関	型式 MODEL	UP-0398
△×		- -		検図1 CHK1	中島	名称 NAME	CRTC BOARD 14/14
△×		- -		設計 DESIGN	五十嵐	日付 DATE	'89-8-16
△×		- -		写図 TRACE	—		日本光
▲×2	33	89-12-22	高橋				


J106
FFC-34BSM1H02
U2W 1
2 U3W
ZCLK 3
4 U1W
EHC 5
6 RCLK
RESP (JA) 7
8 RESP (HA)
E1 9
10 +5Vref
EH 11
12 EP
+8V 13
14 -8V
FCLK 15
16 SYNC
ER 17
18 E3
+15V 19
20 +19V
CONT2 21
22 CONT1
JASTS 23
24 2chECG
JACONT 25
26 XHARST
PAR2 27
28 PAR1
PAR4 29
30 PAR3
XADP 31
32 XRSPOF
33
J001 (ECG/RESP)
PCN10EA-20S-2.54DSA
RESP (JA) 10A
10B JACONT
2chECG 9A
9B JASTS
CONT2 8A
8B CONT1
SYNC 7A
7B FCLK
E3 6A
6B +19V
XRSPOF 5A
5B +15
-8V 4A
4B +8V
ER 3A
3B EHC
EP 2A
2B E1
IMP 1A
1B XADP
J002 (UNIT 1)
PCN10EA-20S-2.54DSA
PAR2 10A
10B XHARST
9A
9B
CONT2 8A
8B CONT1
SYNC 7A
7B FCLK
E3 6A
6B +19V
+5Vref 5A
5B +15
-8V 4A
4B +8V
ER 3A
3B EH
EP 2A
2B E1
U1W 1A
1B
J003 (UNIT 2)
PCN10EA-20S-2.54DSA
PAR3 10A
10B XHARST
9A
9B
CONT2 8A
8B CONT1
SYNC 7A
7B FCLK
E3 6A
6B +19V
+5Vref 5A
5B +15
-8V 4A
4B +8V
ER 3A
3B EH
EP 2A
2B E1
U2W 1A
1B
J004 (UNIT 3)
PCN10EA-20S-2.54DSA
PAR2 10A
10B XHARST
9A
9B
CONT2 8A
8B CONT1
SYNC 7A
7B FCLK
E3 6A
6B +19V
+5Vref 5A
5B +15
-8V 4A
4B +8V
ER 3A
3B EH
EP 2A
2B E1
U3W 1A
1B
J005 HKP-20FDS-19 (RESP)
20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
+5Vref
-8V
ER
+8V
PAR1
ZCLK
RCLK
RESP(HA)
EP
CASE GND
PIN NO.
1B
10B
1A
10A
PCN10EA

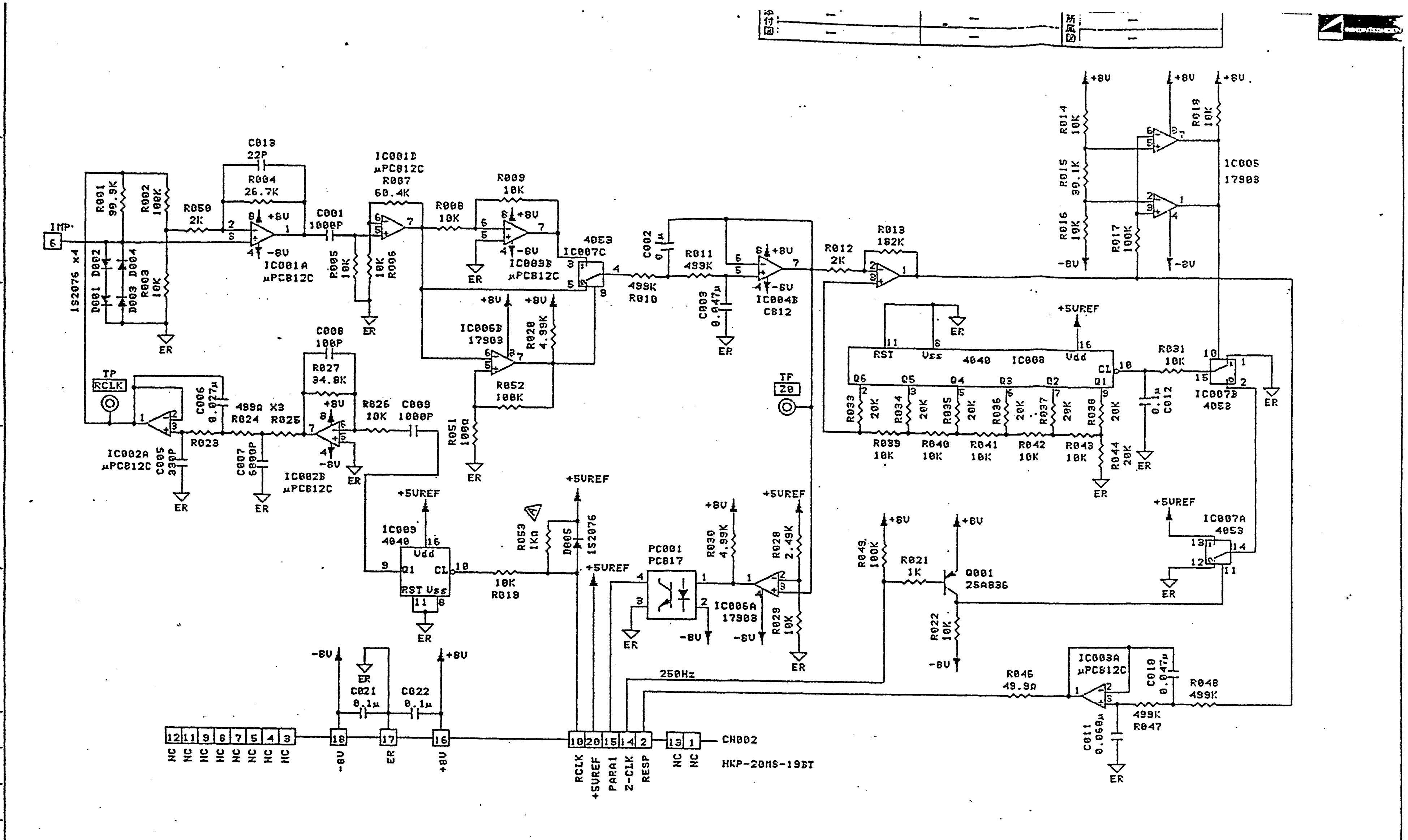
1991年 7月新コードに切替

旧図番	105979	C3

変更 REVIS	理由 REASON	年月日 DATE	検図 CHK
△×	-	-	
△×	-	-	
△×	-	-	
△×	-	-	
△×2	14	89-10-31	高橋
△×	書換	89-6-19	
△×		-	

承認 APPD	安田	図番 DWG NO	0203-020754
検図2 CHK 2		型式 MODEL	UP-0399
検図1 CHK 1	仙波	名称 NAME	HEAD AMPLIFIER MOTHER BOARD
設計 DESIGN	高橋	日付 DATE	89-6-19
写図 TRACE			

日本光電


A
B
C
D
E
F
G
50
0
IMP 6
R001 99.9K
R002 100K
R003 10K
D001 D002 D003 D004
1S2076 x4
R050 2K
C013 22P
R004 26.7K
IC001A μPC812C
C001 1000P
R005 10K
R006 10K
IC001D μPC812C
R007 60.4K
R008 10K
R009 10K
IC003B μPC812C
4053 IC007C
IC006B 17903
R020 4.99K
R052 100K
R051 100Ω
C002 0.1μ
R011 499K
R010 499K
C003 0.047μ
IC004B C812
R012 2K
R013 182K
TP RCLK
IC002A μPC812C
C005 330P
C006 0.027μ
R023
499Ω X3 R024 R025
C007 6800P
C008 100P
R027 34.8K
IC002B μPC812C
R026 10K
C009 1000P
IC009 4040
Vdd Q1 CL RST Vss
R019 10K
R053 1kΩ
D005 1S2076
+5VREF
PC001 PC817
R030 4.99K
R028 2.49K
R029 10K
IC006A 17903
TP 20
IC008 4040
RST Vss Vdd Q6 Q5 Q4 Q3 Q2 Q1 CL
R033 20K
R034 20K
R035 20K
R036 20K
R037 20K
R038 20K
R039 10K
R040 10K
R041 10K
R042 10K
R043 10K
R044 20K
C012 0.1μ
R031 10K
IC007B 4053
IC007A 4053
R014 10K
R015 30.1K
R016 10K
R017 100K
R018 10K
IC005 17903
R049 100K
R021 1K
Q001 2SA836
R022 10K
R046 49.9Ω
IC003A μPC812C
C010 0.047μ
R048 499K
R047 499K
C011 0.068μ
250Hz
C021 0.1μ
C022 0.1μ
+8V
-8V
ER
12 11 9 8 7 5 4 3
NC NC NC NC NC NC NC NC
18 17 16
-8V ER +8V
10 20 15 14 2
RCLK +5VREF PARA1 2-CLK RESP
13 1
NC NC
CH002
HKP-20MS-19ST

IC007 : 4053 POWER

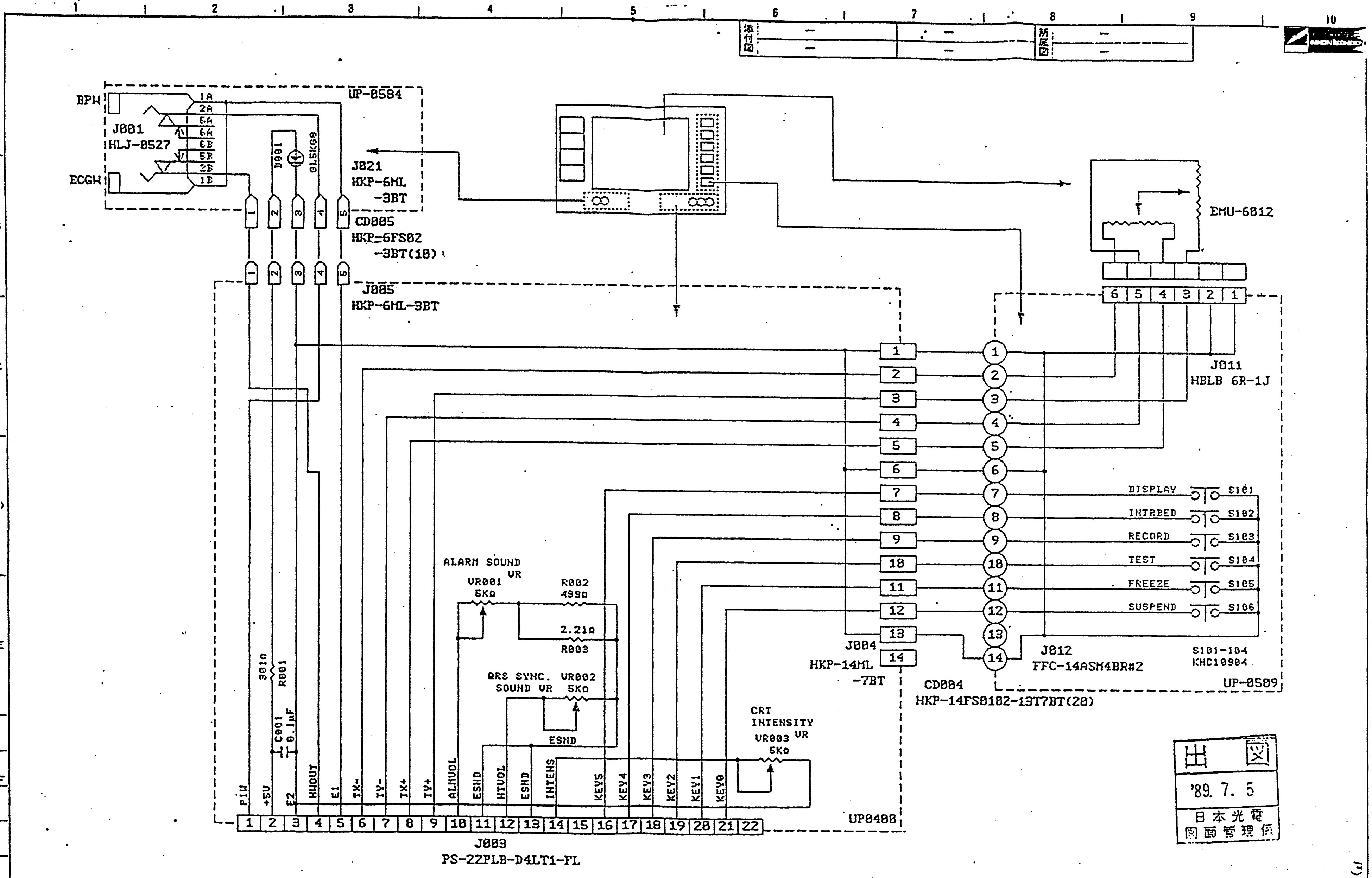
16 Pin Vdd +8V
6 Pin INH -8V
7 Pin Vee -8V
8 Pin Vss -8V

出 図
'89. 7. 5
日本光電
図面管理係

3

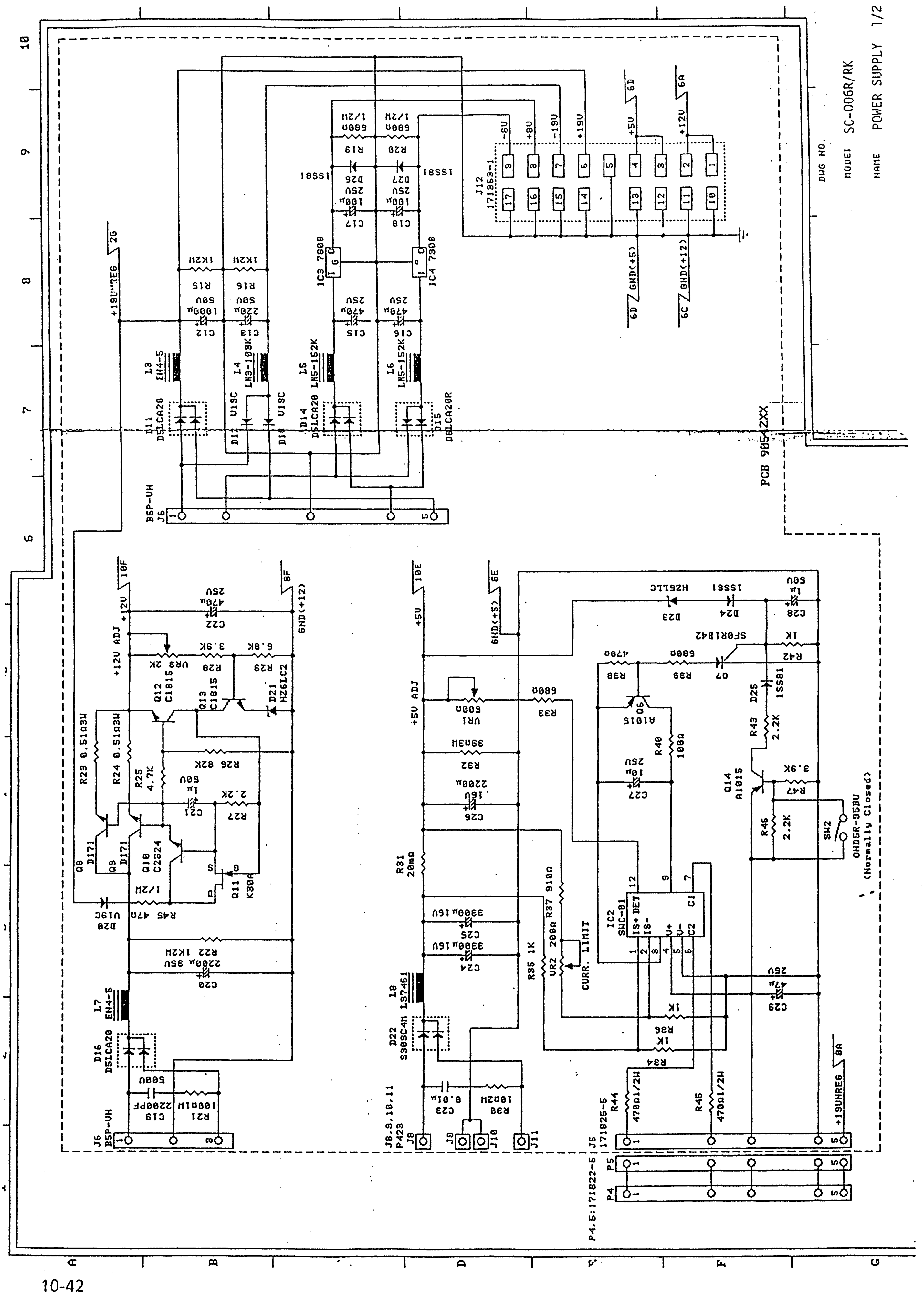
変更 REVIS	理由 REASON	年月日 DATE	検図 CHK
△×		- -	
△×		- -	
△×		- -	
△×		- -	
△×		- -	
△×		- -	
△× 1		'89-6-6	高橋

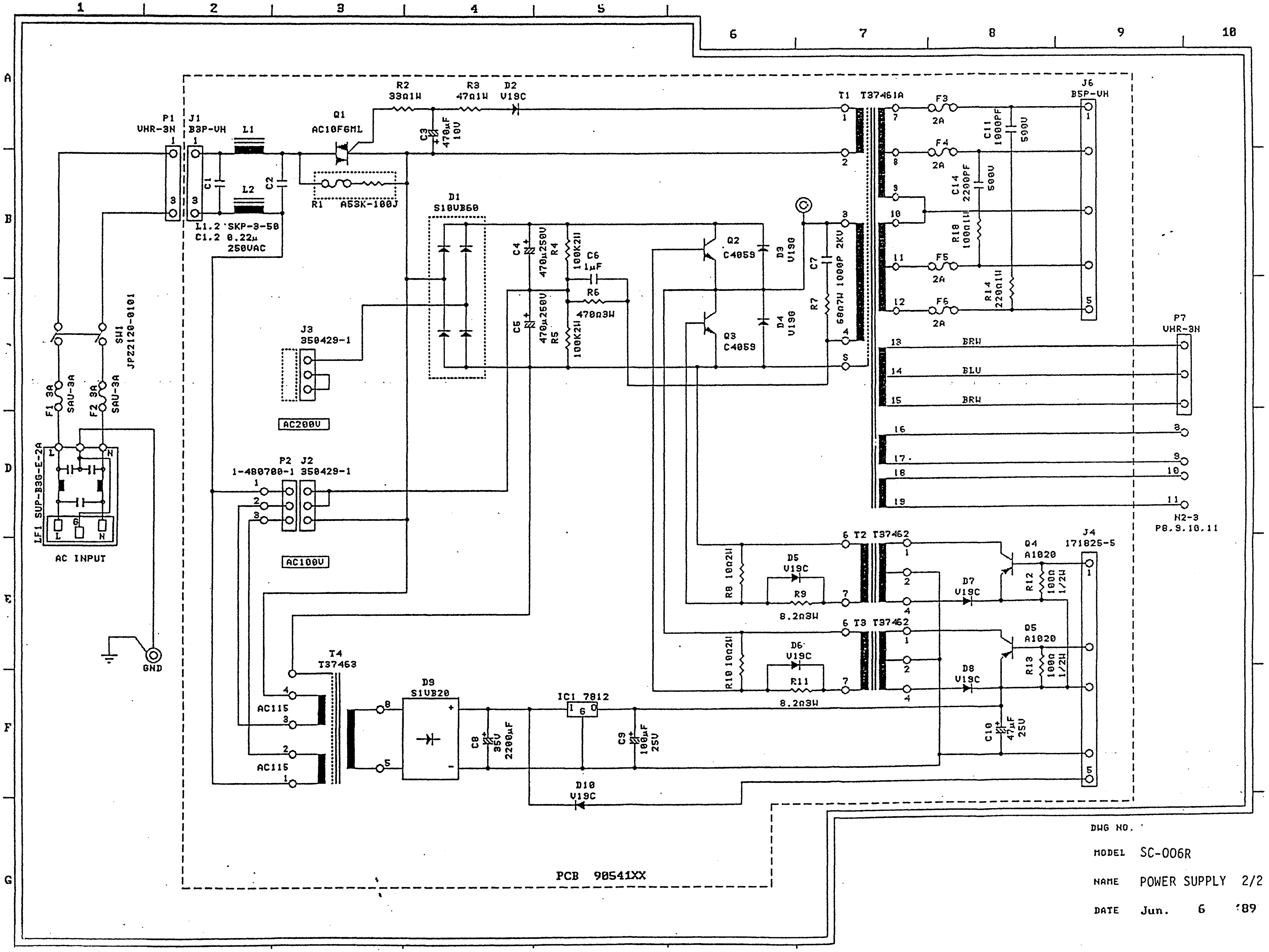
承認 APPD		図番 DWG NO	105986	A
検図2 CHK 2		型式 MODEL	UP-0519	
検図1 CHK 1	仙波	名称 NAME	RESP BOARD	
設計 DESIGN	高橋	日付 DATE	89- 6.-6	
写図 TRACE			日本光電	


UP-0584
BPW
ECGW
J001
HLJ-0527
1A
2A
6A
6A
6B
5B
2B
1B
D001
GL5KG9
J021
HKP-6ML
-3BT
CD005
HKP-6FS02
-3BT(10)
J005
HKP-6ML-3BT
1
2
3
4
5
EMU-6012
J011
HBLB 6R-1J
6 5 4 3 2 1
1 2 3 4 5 6 7 8 9 10 11 12 13 14
J004
HKP-14ML
-7BT
CD004
HKP-14FS0102-13T7BT(20)
J012
FFC-14ASM4BR#2
DISPLAY S101
INTRBED S102
RECORD S103
TEST S104
FREEZE S105
SUSPEND S106
S101-104
KHC10904
UP-0509
ALARM SOUND VR
VR001 5kΩ
R002 499Ω
2.21Ω R003
QRS SYNC. SOUND VR
VR002 5kΩ
ESND
CRT INTENSITY VR
VR003 5kΩ
301Ω R001
C001 0.1μF
PIN
+5V
E2
HWOUT
E1
TX-
TY-
TX+
TY+
ALMVOL
ESND
HTVOL
ESND
INTENS
KEY5
KEY4
KEY3
KEY2
KEY1
KEY0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
UP0400
J003
PS-22PLB-D4LT1-FL
添付図
新底図
1 2 3 4 5 6 7 8 9 10
A B C D E F G

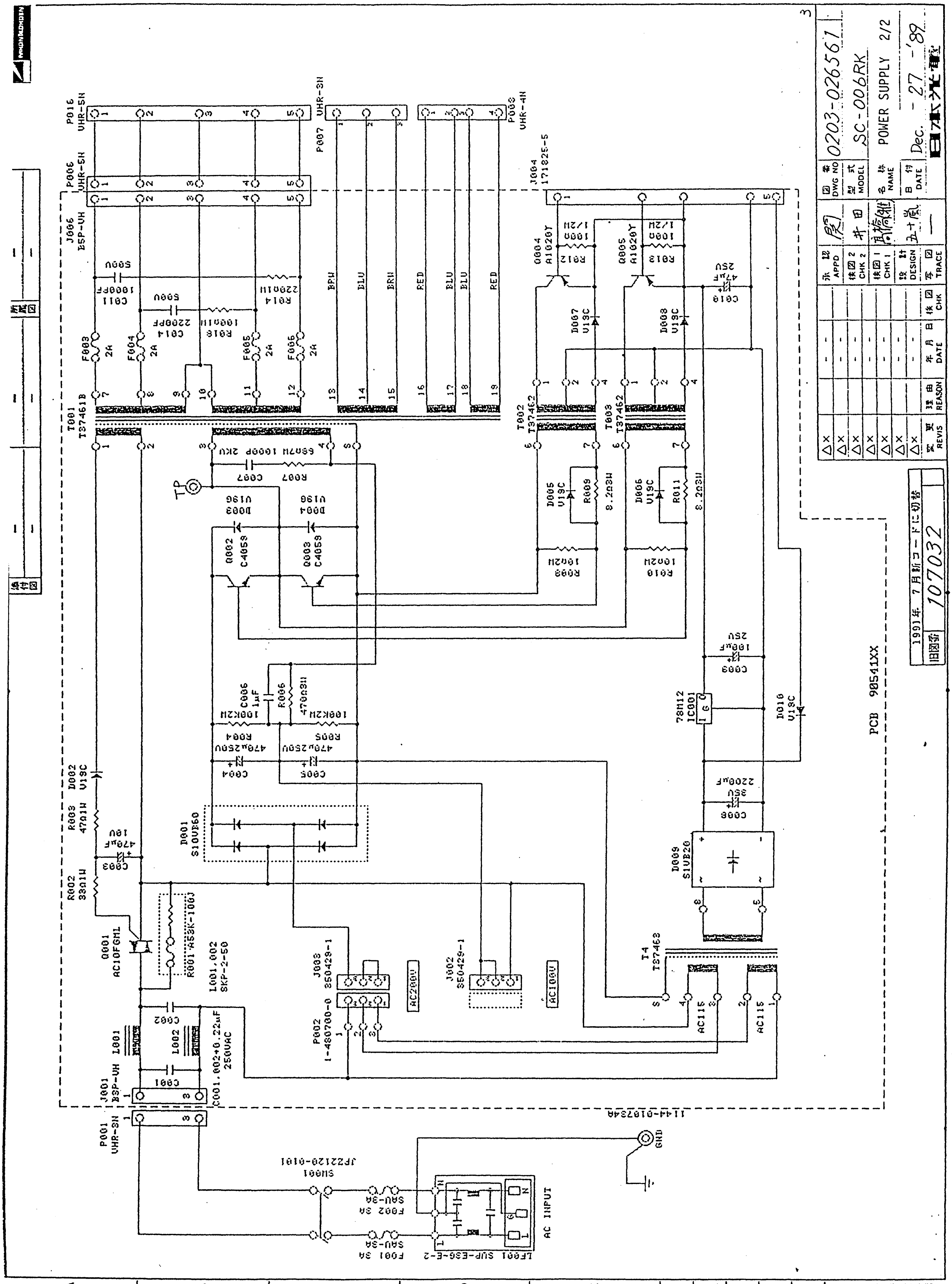
出図
'89. 7. 5
日本光電
図面管理係

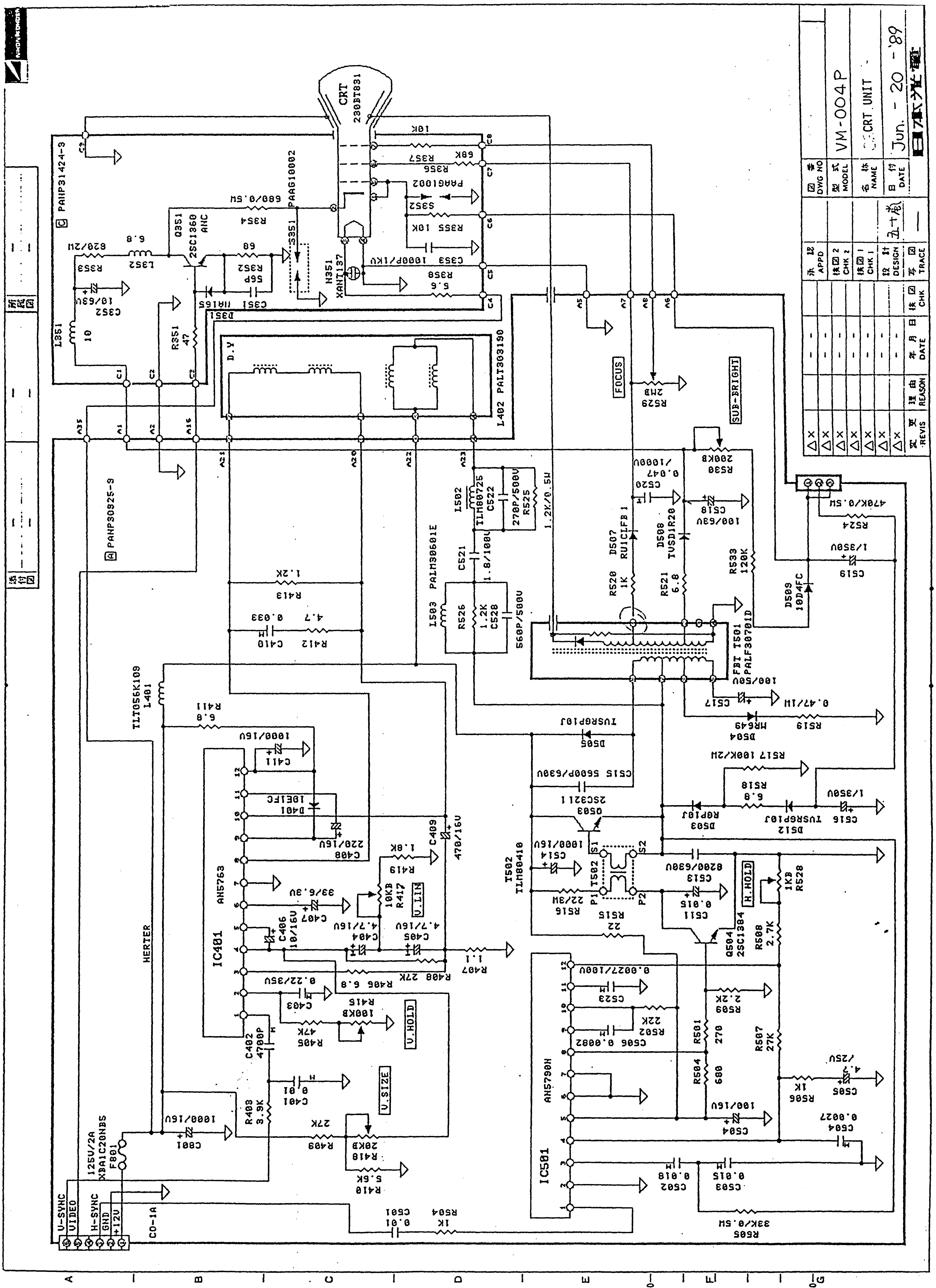
△×		- -		承認 APPD	安田	図番 DWG NO	105980 B
△×		- -		検図2 CHK 2	福泉	型式 MODEL	up-0400,0509,0584
△×		- -		検図1 CHK 1	仙波	名称 NAME	OPERATION BOARDS
△×		- -		設計 DESIGN	高橋	日付 DATE	89-6-19
△×	[illegible]	89-6-19					
△×		- -					
変更 REVIS	理由 REASON	年月日 DATE	検図 CHK	写図 TRACE		日本光電	


DWG NO.
MODEL SC-006R/RK
NAME POWER SUPPLY 1/2
PCB 9054ZXX
J6 BSP-VH
J12 171363-1
J5 171825-5
P4,5:171822-5
J8,9,10,11 P423
IC3 7808
IC4 7908
IC2 SWC-01
D11 D5LCA20
D14 D5LCA20
D15 D5LCA20R
D16 D5LCA20
D22 S30SC4M
L3 EN4-5
L4 LH3-103K
L5 LH5-152K
L6 LH5-152K
L7 EN4-5
L8 L37461
Q8 D171
Q9 D171
Q10 C2324
Q11 K30A
Q12 C1815
Q13 C1815
Q6 A1015
Q14 A1015
Q7 SF0R1B42
D21 HZ6LC2
D23 HZ6LLC
D24 1SS81
D25 1SS81
D26 1SS81
D27 1SS81
D20 V19C
D12 V19C
D13 V19C
+12V ADJ
UR3 2K
+5V ADJ
UR1 500Ω
UR2 200Ω
CURR. LIMIT
SW2 OHD5R-95BU (Normally Closed)
+19V UNREG
+12V
+5V
-6V
+8V
-19V
+19V
GND(+12)
GND(+5)
10F
8F
10E
8E
6D
6A
6C
2G
8A
C12 1000μ 50V
C13 220μ 50V
C15 470μ 25V
C16 470μ 25V
C17 100μ 25V
C18 100μ 25V
C19 2200PF 500V
C20 2200μ 35V
C21 1μ 50V
C22 470μ 25V
C23 0.01μ
C24 3300μ 16V
C25 3300μ 16V
C26 2200μ 16V
C27 10μ 25V
C28 1μ 50V
C29 1μ 25V
R15 1K2W
R16 1K2W
R19 680 1/2W
R20 680 1/2W
R21 100Ω1W
R22 1K2W
R23 0.51Ω3W
R24 0.51Ω3W
R25 4.7K
R26 82K
R27 2.2K
R28 3.9K
R29 6.8K
R30 10Ω2W
R31 20mΩ
R32 39Ω3W
R33 680Ω
R35 1K
R36 1K
R37 910Ω
R38 470Ω
R39 680Ω
R40 100Ω
R42 1K
R43 2.2K
R44 470Ω1/2W
R45 470Ω1/2W
R46 2.2K
R47 3.9K
R34
R45 470

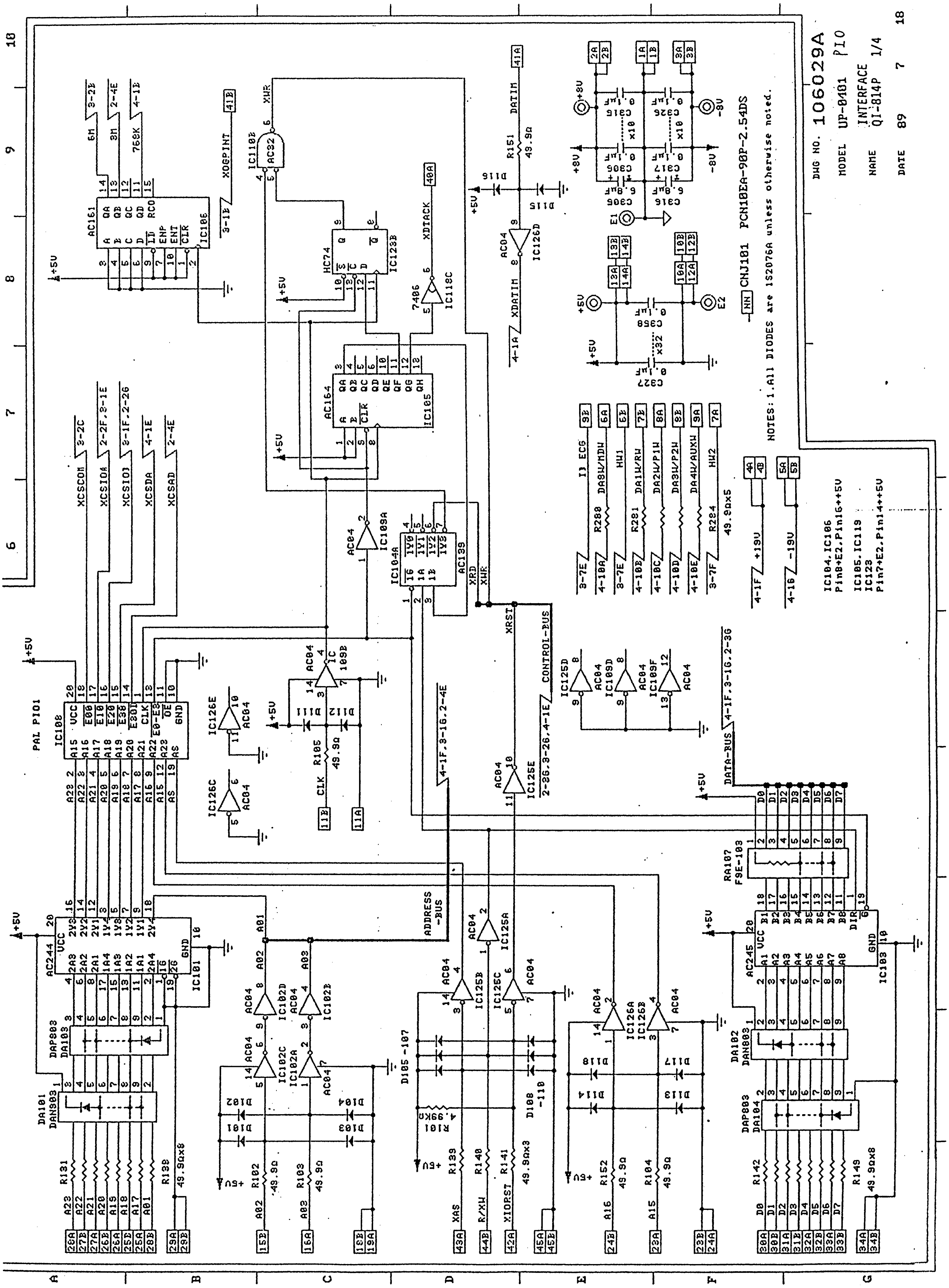

1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
F
G
P1
VHR-3N
J1
B3P-VH
L1
L2
C1
C2
L1.2 SKP-3-50
C1.2 0.22μ
250VAC
Q1
AC10F6ML
R1
A53K-100J
R2
33Ω1W
R3
47Ω1W
D2
V19C
C3
470μF
10V
D1
S10VB60
C4
470μ250V
R4
100K2W
C5
470μ250V
R5
100K2W
C6
1μF
R6
470Ω3W
Q2
C4059
Q3
C4059
D3
V19G
D4
V19G
C7
1000P 2KV
R7
68Ω7W
T1
T37461A
F3
F4
F5
F6
2A
C11
1000PF
500V
C14
2200PF
500V
R18
100Ω1W
R14
220Ω1W
J6
B5P-VH
P7
VHR-3N
BRW
BLU
BRW
N2-3
P8.9.10.11
SH1
JP22120-0101
F1 3A
SAU-3A
F2 3A
SAU-3A
LF1 SUP-B3G-E-2A
L
N
G
AC INPUT
GND
J3
350429-1
AC200V
P2
1-480700-1
J2
350429-1
AC100V
T4
T37463
AC115
AC115
D9
S1VB20
C8
35V
2200μF
IC1 7812
C9
100μF
25V
D10
V19C
T2 T37462
T3 T37462
R8 10Ω2W
R10 10Ω2W
D5
V19C
D6
V19C
R9
R11
8.2Ω3W
8.2Ω3W
D7
V19C
D8
V19C
Q4
A1020
Q5
A1020
R12
R13
100Ω
1/2W
C10
47μF
25V
J4
171825-5
PCB 90541XX

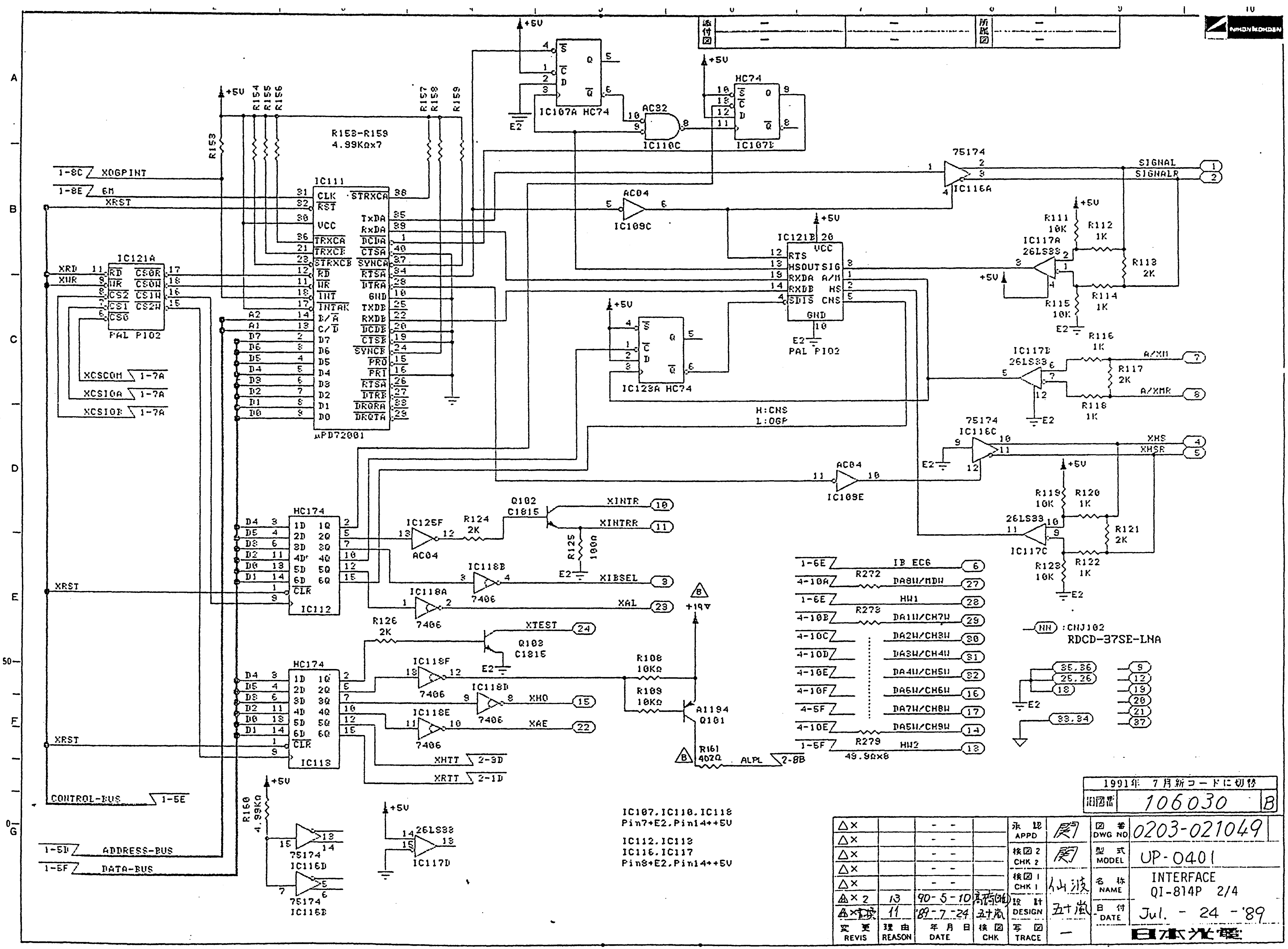
DWG NO.
MODEL SC-006R
NAME POWER SUPPLY 2/2
DATE Jun. 6 '89

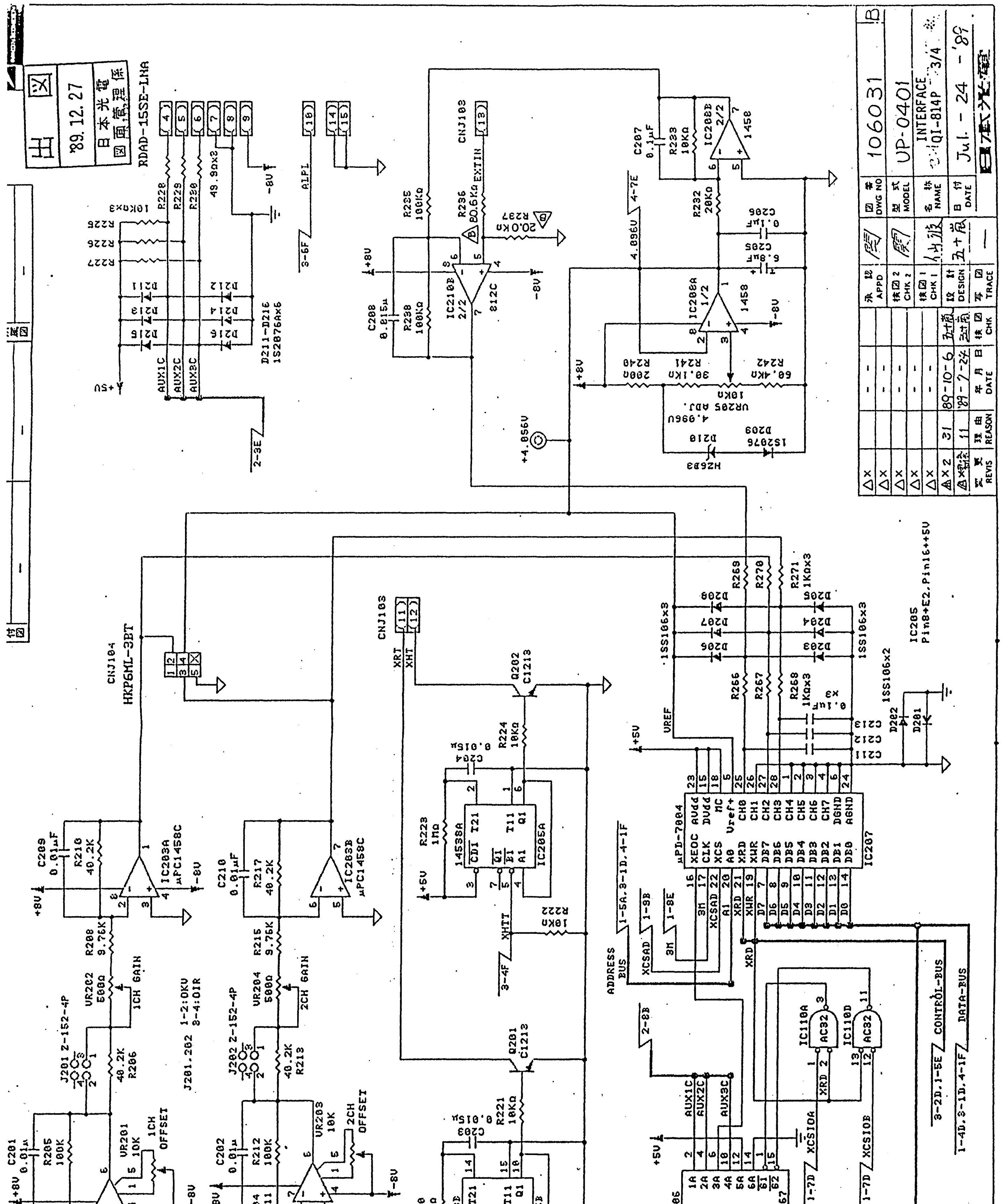

0203-026561
SC-006RK
POWER SUPPLY 2/2
Dec. - 27 -'89
日本光電
図番 DWG NO
型式 MODEL
名称 NAME
日付 DATE
承認 APPD
検図2 CHK 2
検図1 CHK 1
設計 DESIGN
写図 TRACE
変更 REVIS
理由 REASON
年月日 DATE
検図 CHK
井田
五十嵐
1991年 7月新コードに切替
旧図番 107032
PCB 90541XX
3
T001 T37461B
T002 T37462
T003 T37462
T4 T37463
J004 171825-5
P006 UHR-5N
J006 B5P-VH
P016 UHR-5N
P007 UHR-3N
P008 UHR-4N
BRN
BLU
BRN
RED
BLU
BLU
RED
F003 2A
F004 2A
F005 2A
F006 2A
C011 1000PF 500V
C014 2200PF 500V
R016 100Ω1W
R014 220Ω1W
Q004 A1020Y
Q005 A1020Y
R012 100Ω 1/2W
R013 100Ω 1/2W
D007 V19C
D008 V19C
C010 47μF 25V
D005 V19C
D006 V19C
R009 8.2Ω3W
R011 8.2Ω3W
R008 10Ω2W
R010 10Ω2W
C007 1000P 2KV
R007 680Ω2W
TP
D003 V19G
D004 V19G
Q002 C4059
Q003 C4059
C009 100μF 25V
78M12 IC001
D010 V19C
C006 1μF
R006 470Ω3W
R004 100K2W
R005 100K2W
C004 470μ250V
C005 470μ250V
D002 V19C
R003 470Ω1W
C003 470μF 10V
R002 330Ω1W
D001 S10VB60
C008 2200μF 35V
D009 S1VB20
Q001 AC10FGM1
L001,002 SKP-2-50
R001 A53K-100J
J003 350429-1
J002 3E0429-1
AC200V
AC100V
P002 1-480700-0
AC115
AC115
L001
L002
C002
C001
C001,002:0.22μF 250VAC
J001 B3P-VH
P001 UHR-3N
1144-010734A
GND
SW001 JF22120-0101
F002 3A SAU-3A
F001 3A SAU-3A
LF001 SUP-E3G-E-2
AC INPUT
A
B
C
D
E
F
G



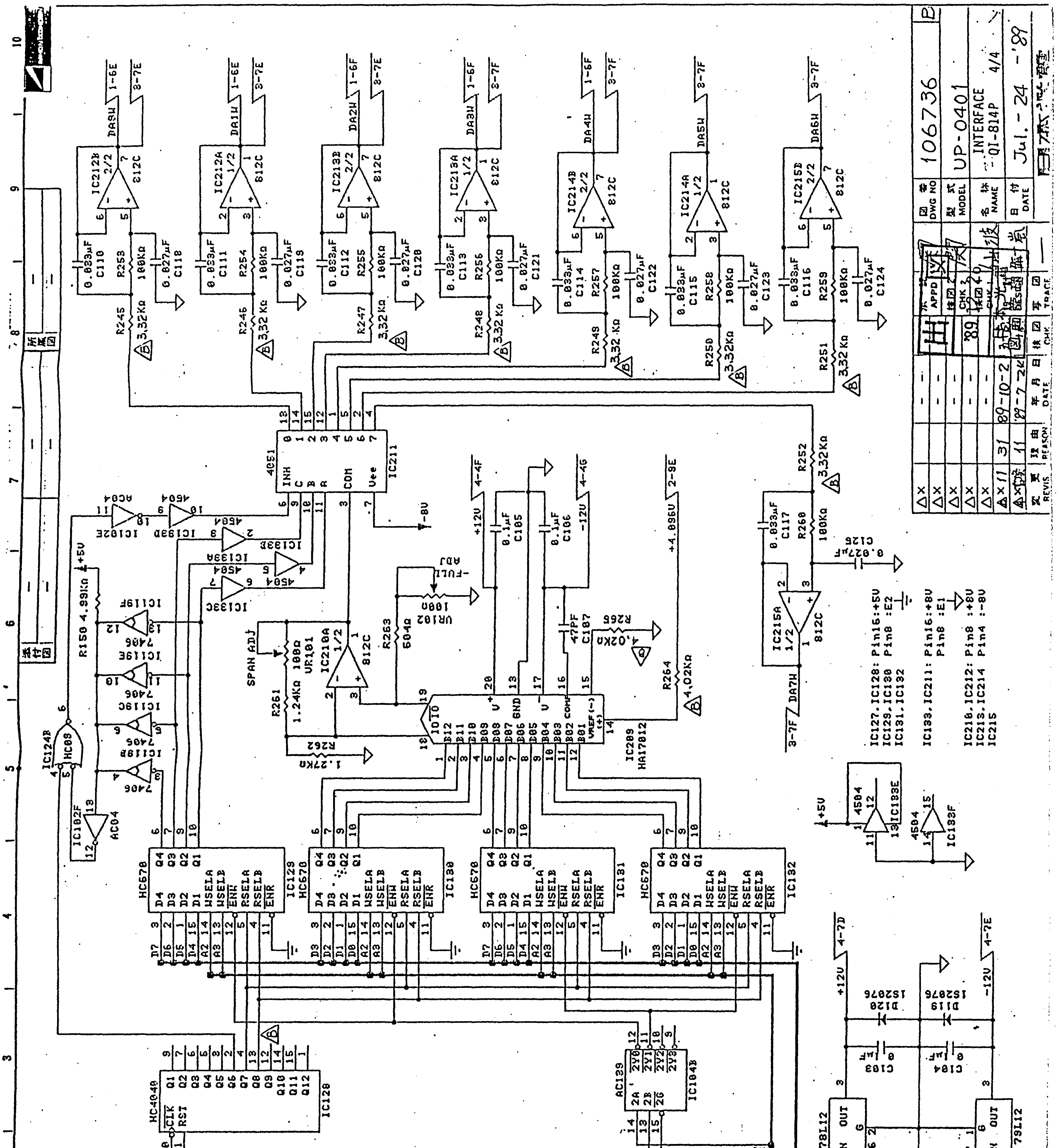
VM-004P
CRT UNIT
Jun. - 20 - '89
図番 DWG NO
型式 MODEL
名称 NAME
日付 DATE
承認 APPD
検図2 CHK 2
検図1 CHK 1
設計 DESIGN
写図 TRACE
変更 REVIS
理由 REASON
年月日 DATE
検図 CHK
五十嵐
CRT 230BT831
Q351 2SC1360 AHC
L351
L352
L401 TLT056K109
L402 PALT303190
D.Y
FOCUS
SUB-BRIGHT
H.HOLD
V.HOLD
V.SIZE
V.LIN
HERTER
IC401 AN5763
IC501 AN5790N
T502 TLM80410
FBT T501 PALF30701D
L502 TLM80725
L503 PALM30501E
Q503 2SC3211
Q504 2SC1384
D507 RU1CLFB1
D508 TVSD1R20
D509 10D4FC
D401 10E1FC
F801 XBA1C20NBS 125V/2A
H351 XAHT137
PAAG10002
PANP31424-3
PANP30825-3
CO-1A
V-SYNC
VIDEO
H-SYNC
GND
+12V

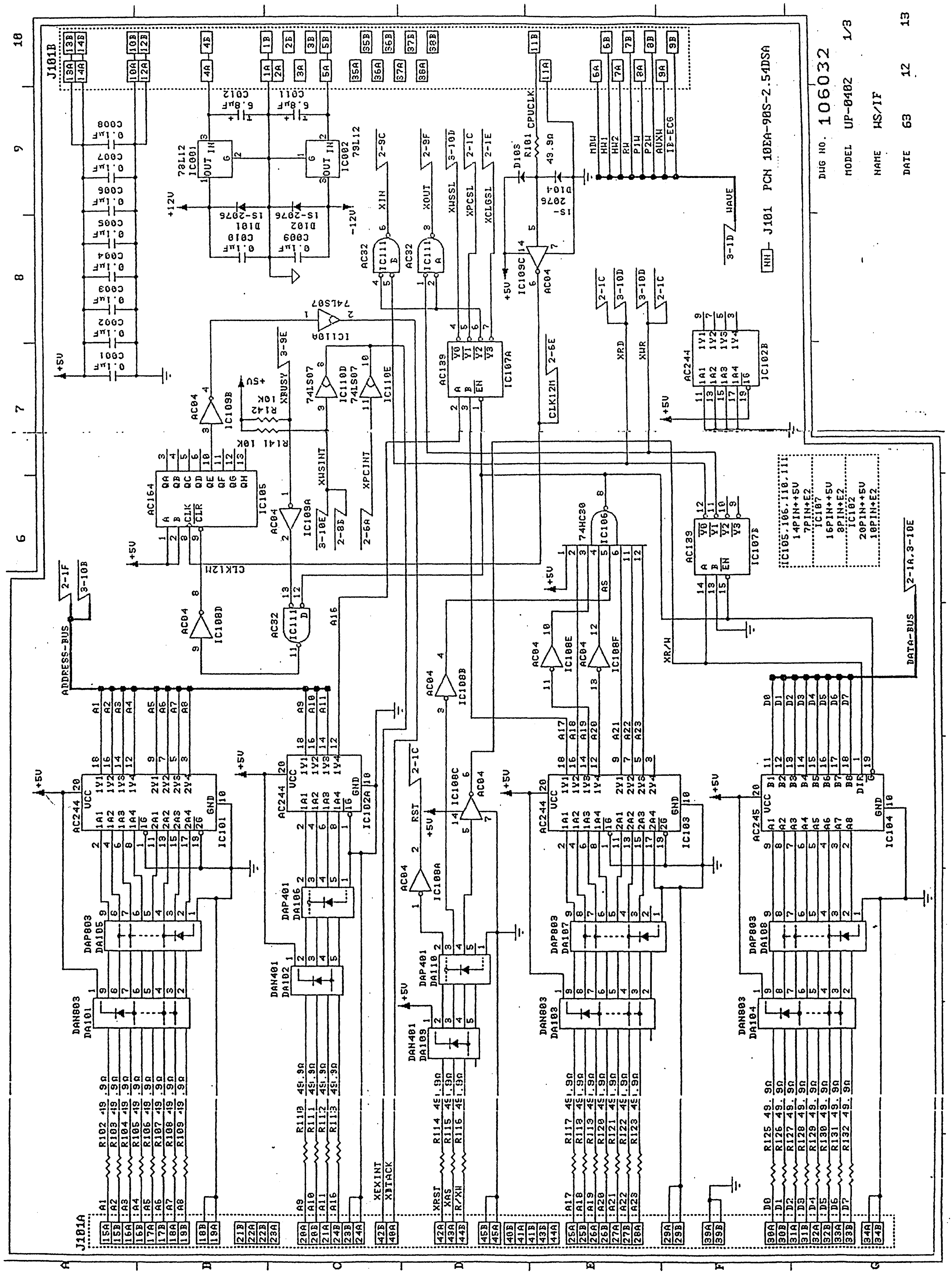

DWG NO. 106029A
MODEL UP-0101 PIO
NAME INTERFACE QI-814P 1/4
DATE 89 7 18
NOTES: 1.All DIODES are 1S2076A unless otherwise noted.
CNJ101 PCN10EA-90P-2.54DS
IC104,IC106 Pin8+E2,Pin16++5V
IC105,IC119 IC123 Pin7+E2,Pin14++5V
PAL PI01
IC108
AC244
IC101
AC245
IC103
AC161
IC106
AC164
IC105
AC139
IC104A
HC74
IC123B
AC32
IC110B
7406
IC118C
RA107 F9E-103
ADDRESS-BUS
DATA-BUS
CONTROL-BUS
XCSCOM
XCSIOA
XCSIO1
XCSDA
XCSAD
XOGPINT
XDTACK
XDATIN
DATIN
XRD
XWR
XRST
CLK
6M
3M
768K
+5V
+8V
-8V
+19V
-19V
49.9Ωx8
49.9Ωx5
49.9Ωx3
4.99KΩ
D105 -107
D108 -110
DA101 DAN803
DA103 DAP803
DA102 DAN803
DA104 DAP803
A
B
C
D
E
F
G
6
7
8
9
10

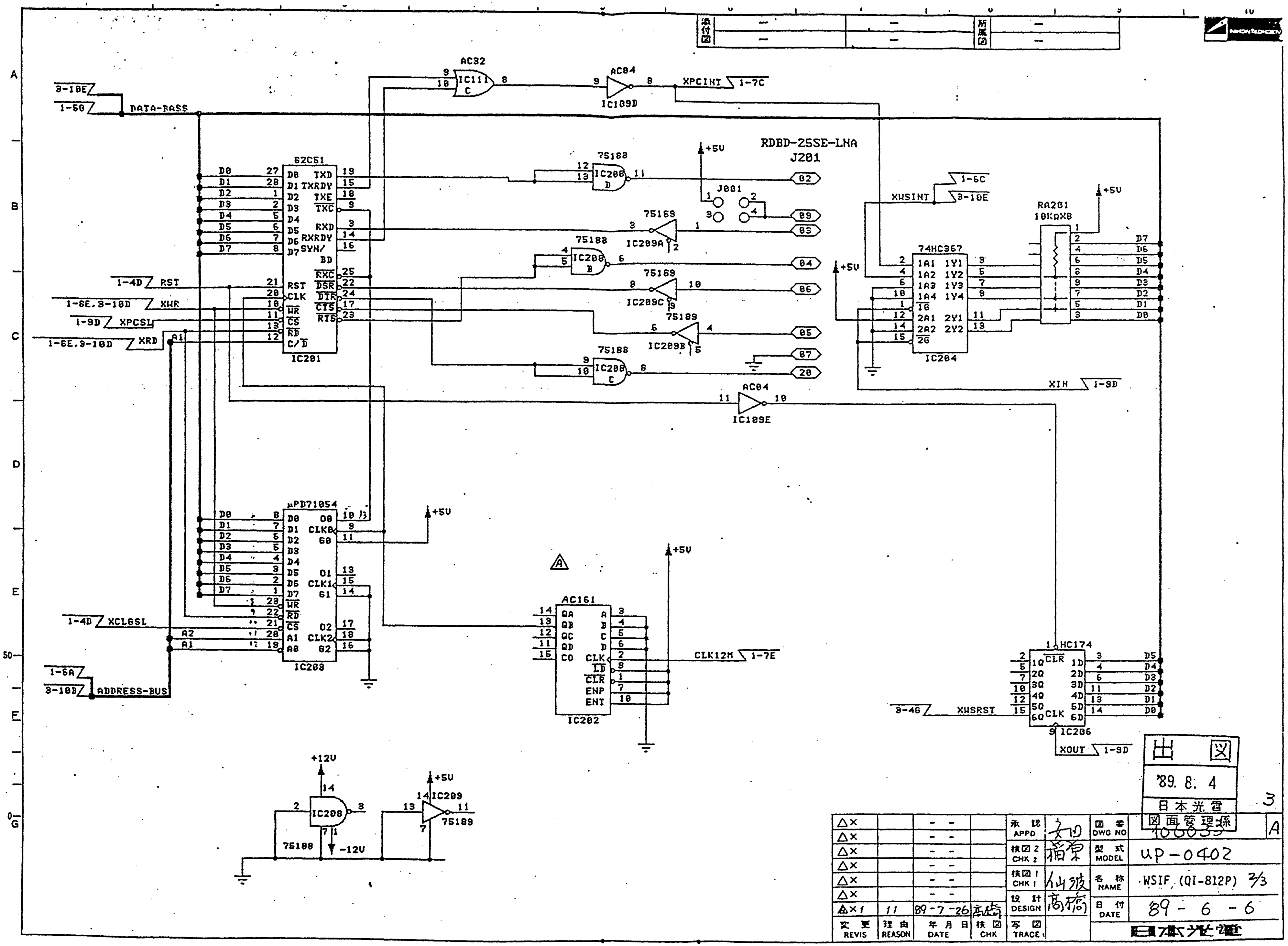

IC111
μPD72001
IC121A
PAL P102
IC121B
PAL P102
IC107A HC74
IC107B HC74
IC110C AC32
IC123A HC74
IC109C AC04
IC109E AC04
IC116A 75174
IC116C 75174
IC116D 75174
IC116B 75174
IC117A 26LS33
IC117B 26LS33
IC117C 26LS33
IC117D 26LS33
IC112 HC174
IC113 HC174
IC125F AC04
IC118A 7406
IC118B 7406
IC118D 7406
IC118E 7406
IC118F 7406
Q101 A1194
Q102 C1815
Q103 C1815
R153-R159
4.99KΩx7
R160 4.99KΩ
R161 402Ω
R108 10KΩ
R109 10KΩ
R124 2K
R125 100Ω
R126 2K
R279 49.9Ωx8
1-8C XOGPINT
1-8E EM
XRST
XRD
XWR
XCSCOM 1-7A
XCSIOA 1-7A
XCSIOB 1-7A
CONTROL-BUS 1-5E
1-5D ADDRESS-BUS
1-5F DATA-BUS
SIGNAL ①
SIGNALR ②
A/XM ⑦
A/XMR ⑧
XHS ④
XHSR ⑤
H:CNS
L:OGP
XINTR ⑩
XINTRR ⑪
XIBSEL ③
XAL ㉓
XTEST ㉔
XHO ⑮
XAE ㉒
XHTT 2-3D
XRTT 2-1D
ALPL 2-8B
+19V
1-6E IB EC6 ⑥
4-10A DA8W/MDW ㉗
1-6E HW1 ㉘
4-10B DA1W/CH7W ㉙
4-10C DA2W/CH3W ㉚
4-10D DA3W/CH4W ㉛
4-10E DA4W/CH5W ㉜
4-10F DA6W/CH6W ⑯
4-5F DA7W/CH8W ⑰
4-10E DA5W/CH9W ⑭
1-5F HW2 ⑬
NN :CNJ102
RDCD-37SE-LNA
35,36 25,26 18 E2
33,34
9 12 19 20 21 37
IC107.IC110.IC118
Pin7+E2.Pin14++5V
IC112.IC113
IC116.IC117
Pin8+E2.Pin14++5V
1991年 7月新コードに切替
旧図番 106030 B
図番 DWG NO 0203-021049
型式 MODEL UP-0401
名称 NAME INTERFACE QI-814P 2/4
日付 DATE Jul. - 24 - '89
承認 APPD 関
検図2 CHK 2 関
検図1 CHK 1 仙波
設計 DESIGN 五十嵐
写図 TRACE —
⚠×2 13 90-5-10 高橋
⚠×追加 11 '89-7-24 五十嵐
変更 REVIS 理由 REASON 年月日 DATE 検図 CHK
日本光電
NIHON KOHDEN
添付図
所属図

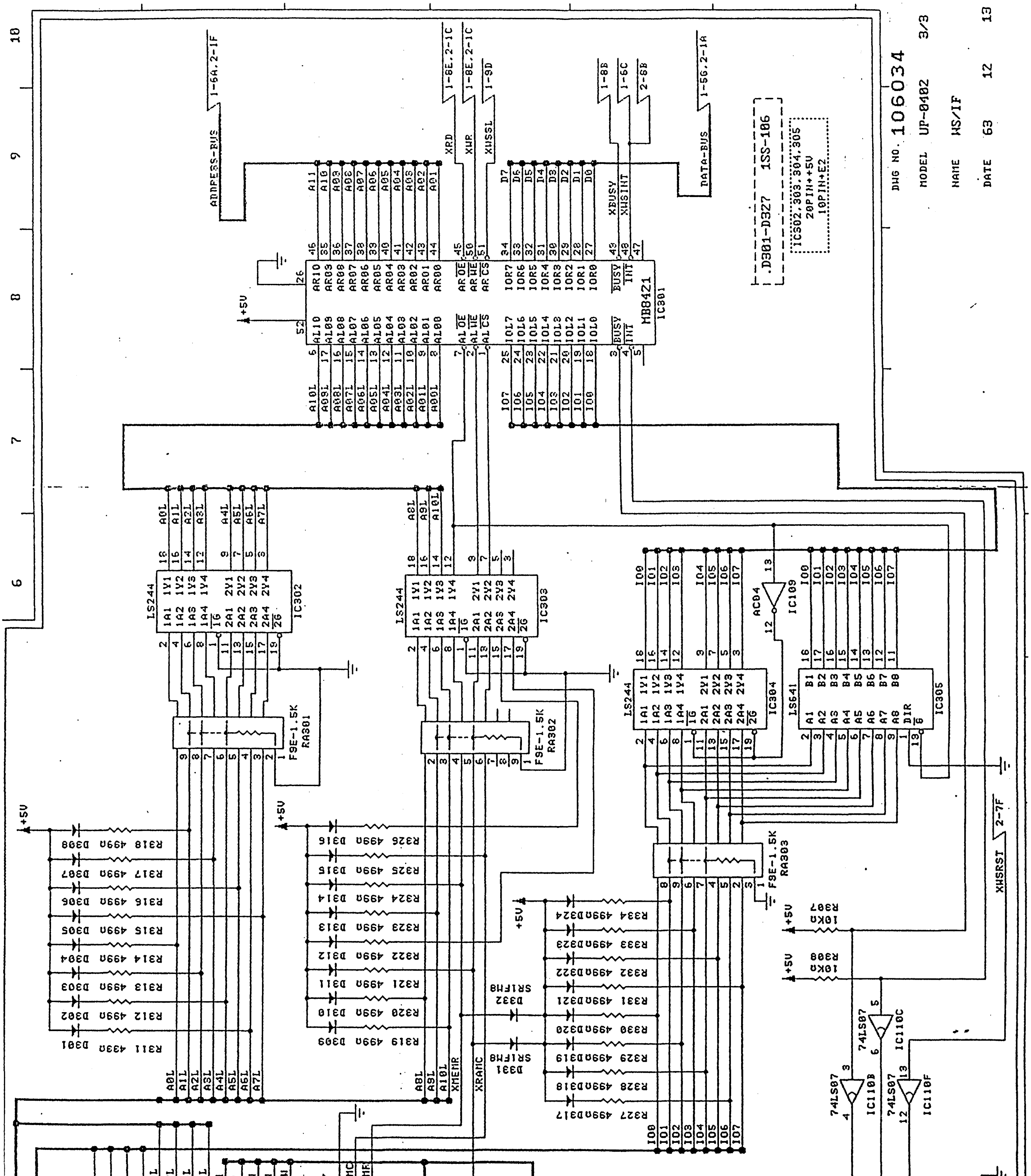


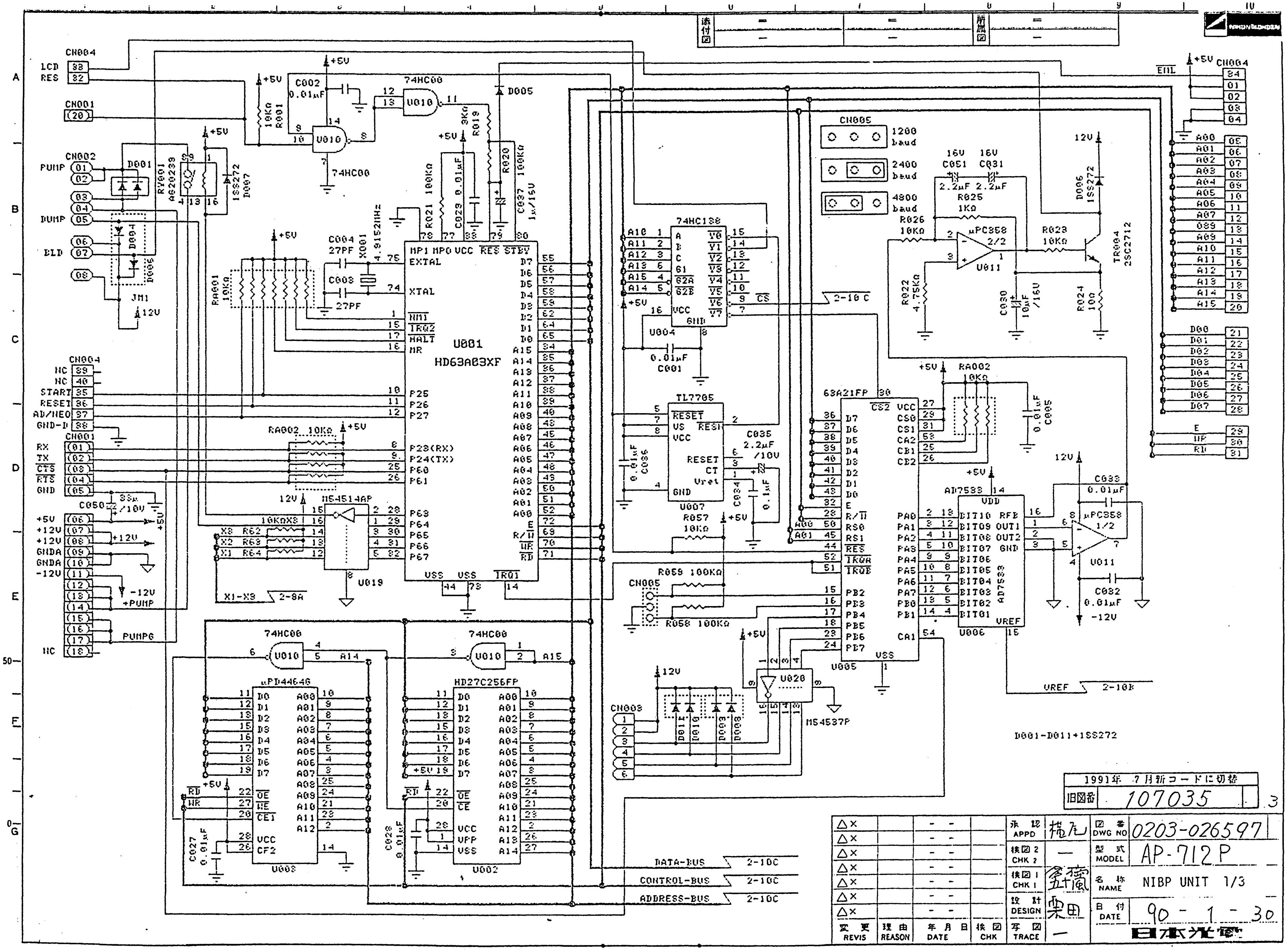
出図
'89.12.27
日本光電
図面管理係
106031
B
UP-0401
INTERFACE
QI-814P 3/4
Jul. - 24 - '89
日本光電
RDAD-15SE-LMA
CNJ103
CNJ104
HKP6ML-3BT
IC201 μPC811
IC202 μPC811
IC203A μPC1458C
IC203B μPC1458C
IC205A
IC205B
IC206 HC367
IC207 μPD-7004
IC208A 1/2 1458
IC208B 2/2 1458
IC210B 2/2 812C
IC110A AC32
IC110D AC32
Q201 C1213
Q202 C1213
D211-D216 1S2076Ax6
1SS106x3
1SS106x2
IC205 Pin8→E2, Pin16→+5V
AUX1IN
AUX2IN
AGND
1CH GAIN
2CH GAIN
1CH OFFSET
2CH OFFSET
UR205 ADJ. 4.096U
+4.096U
EXTIN
XRT
XHT
ADDRESS BUS
CONTROL-BUS
DATA-BUS
J201.202 1-2:OKV 3-4:OIR


106736
UP-0401
INTERFACE QI-814P 4/4
Jul. -24 -'89
DWG NO
MODEL
NAME
DATE
APPD
CHK
TRACE
REVIS
REASON
89-10-2
89-7-26
IC212B 2/2 812C
IC212A 1/2 812C
IC213B 2/2 812C
IC213A 1/2 812C
IC214B 2/2 812C
IC214A 1/2 812C
IC215B 2/2 812C
IC215A 1/2 812C
IC210A 1/2 812C
DA5H
DA1H
DA2H
DA3H
DA4H
DA5H
DA6H
DA7H
1-6E
3-7E
1-6F
3-7F
R245 3.32KΩ
R246 3.32KΩ
R247 3.32KΩ
R248 3.32KΩ
R249 3.32KΩ
R250 3.32KΩ
R251 3.32KΩ
R252 3.32KΩ
R253 100KΩ
R254 100KΩ
R255 100KΩ
R256 100KΩ
R257 100KΩ
R258 100KΩ
R259 100KΩ
R260 100KΩ
C110 0.033μF
C111 0.033μF
C112 0.033μF
C113 0.033μF
C114 0.033μF
C115 0.033μF
C116 0.033μF
C117 0.033μF
C118 0.027μF
C119 0.027μF
C120 0.027μF
C121 0.027μF
C122 0.027μF
C123 0.027μF
C124 0.027μF
C125 0.027μF
IC211 4051
INH C B A COM Vee
-8V
+12V
-12V
4-4F
4-4G
C105 0.1μF
C106 0.1μF
C107 47PF
R265 4.02KΩ
R264 4.02KΩ
+4.096V 2-9E
IC209 HA17812
IOTO B12 B11 B10 B09 B08 B07 B06 B05 B04 B03 B02 B01 VREF(-) (+) COMP V+ V- GND
R263 604Ω
UR102 100Ω -FULL ADJ
UR101 100Ω SPAN ADJ
R261 1.24KΩ
R262 1.27KΩ
R150 4.99KΩ
+5V
IC102E AC04
IC103D 4504
IC133E
IC133A 4504
IC133C 4504
IC119F 7406
IC119E 7406
IC119C 7406
IC119B 7406
IC124B HC08
IC102F AC04
IC129 HC670
IC130 HC670
IC131 HC670
IC132 HC670
D4 D3 D2 D1 WSELA WSELB ENW RSELA RSELB ENR
Q4 Q3 Q2 Q1
D7 D6 D5 D4 A2 A3
D3 D2 D1 D0 A2 A3
IC128 HC4040
CLK RST
Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12
IC127 HC161
QA QB QC QD CO A B C D CLK LD CLR ENP ENT
IC126F AC04
IC104B AC139
2A 2B 2G 2Y0 2Y1 2Y2 2Y3
XWR
XCSDA
CONTROL-BUS
ADDRESS-BUS
DATA-BUS
1-8E XDATIN
1-9E 768K
1-7B
3-2D,2-4E,1-5F
3-1D,2-4D,1-4D
3-1D,2-3D,1-4G
IC119A 7406
IC119D 7406
IC124A HC08
IC124C HC08
IC124D HC08
IC133E 4504
IC133F 4504
IC127,IC128: Pin16:+5V Pin8 :E2
IC129,IC130 IC131,IC132
IC133,IC211: Pin16:+8V Pin8 :E1
IC210,IC212: Pin8 :+8V Pin4 :-8V
IC213,IC214 IC215
4-7D
4-7E
D120 1S2076
D119 1S2076
C103 0.1μ
C104 0.1μ
C101 47μ
C102 47μ
IC216 78L12
IC217 79L12
IN OUT G
1-6F +15V
1-6F -15V
A B C D E F G
1 2 3 4 5 6 7 8 9 10


DWG NO. 106032
MODEL UP-0402 1/3
NAME WS/IF
DATE 63 12 13
J101 PCN 10EA-90S-2.54DSA
J101A
J101B
ADDRESS-BUS
DATA-BUS
IC101 AC244
IC102A AC244
IC102B AC244
IC103 AC244
IC104 AC245
IC105 AC164
IC106 74HC30
IC107A AC139
IC107B AC139
IC108 AC04
IC109 AC04
IC110 74LS07
IC111 AC32
IC001 78L12
IC002 79L12
DA101 DAN803
DA102 DAN401
DA103 DAN803
DA104 DAN803
DA105 DAP803
DA106 DAP401
DA107 DAP803
DA108 DAP803
DA109 DAN401
DA110 DAP401
CPUCLK
CLK12M
XBUSY
XWSINT
XPCINT
XIN
XOUT
XWSSL
XPCSL
XCLGSL
XRD
XWR
XR/W
RST
XEXINT
XDTACK
XRSI
XAS
WAVE
MDW
WH1
WH2
RW
P1W
P2W
AUXW
IB-ECG
+5V
+12V
-12V
IC105.106.110.111 14PIN→+5V 7PIN→E2
IC107 16PIN→+5V 8PIN→E2
IC102 20PIN→+5V 10PIN→E2
A B C D E F G
6 7 8 9 10


82C51
IC201
μPD71054
IC203
AC161
IC202
74HC367
IC204
HC174
IC206
RA201
10KΩx8
RDBD-25SE-LNA
J201
J001
AC32
IC111 C
AC04
IC109D
IC109E
75188
IC208 B
IC208 C
IC208 D
75189
IC209A
IC209B
IC209C
IC209
DATA-BASS
ADDRESS-BUS
XPCINT
XHSINT
XHSRST
XIN
XOUT
XCLGSL
CLK12M
RST
XWR
XPCSL
XRD
3-10E
1-5G
1-4D
1-6E,3-10D
1-9D
1-6A
3-10B
1-7C
1-6C
1-7E
3-4G
+5V
+12V
-12V
02
03
04
05
06
07
09
20
出図
'89. 8. 4
日本光電
図面管理係
3
図番 DWG NO 106035
A
型式 MODEL UP-0402
名称 NAME WSIF (QI-812P) 2/3
日付 DATE 89 - 6 - 6
承認 APPD
検図2 CHK 2
検図1 CHK 1
設計 DESIGN 高橋
写図 TRACE
△×1 11 89-7-26 高橋
変更 REVIS
理由 REASON
年月日 DATE
検図 CHK
添付図
所属図
日本光電

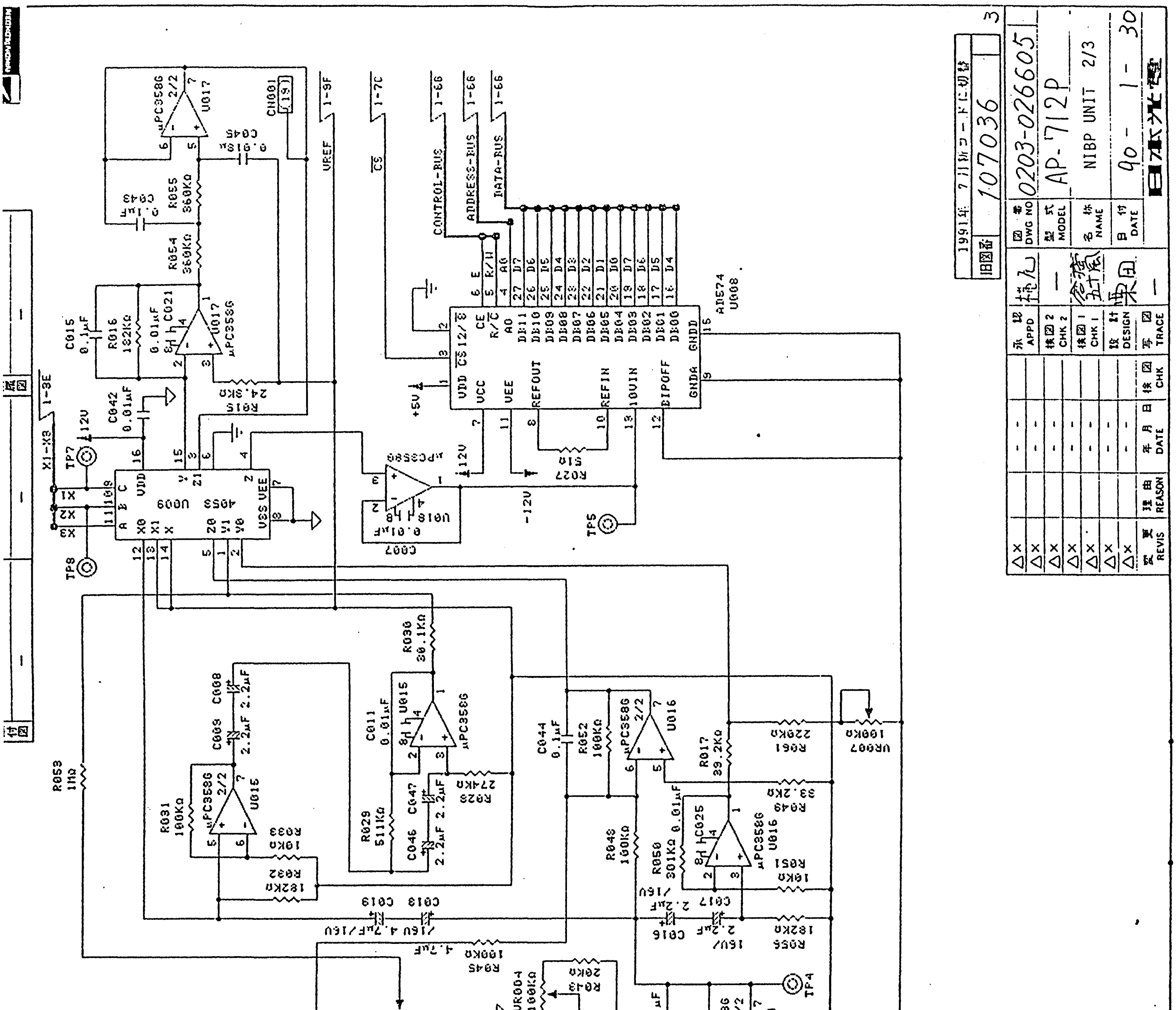

DWG NO. 106034 3/3
MODEL UP-0402
NAME WS/IF
DATE 63 12 13
D301-D327 1SS-106
IC302,303,304,305
20PIN+5V
10PIN+E2
MB8421
IC301
LS244
IC302
IC303
IC304
LS641
IC305
AC04
IC109
74LS07
IC110B
IC110C
IC110F
F9E-1.5K
RA301
RA302
RA303
J301
RDCD-37SE-LNA
ADDRESS-BUS
DATA-BUS
1-6A,2-1F
1-8E,2-1C
1-9D
1-8B
1-6C
2-6B
1-5G,2-1A
2-7F
1-8F
XRD
XWR
XWSSL
XBUSY
XWSINT
XWSRST
XRAMC
XMEMR
XCOMW
WAVE
INT
XRST
BUSY
D331 SR1FM8
D332 SR1FM8
R307 10KΩ
R308 10KΩ
+5V


CN004
LCD
RES
CN001
CN002
PUMP
DUMP
BLD
JM1
D001
D004
D006
RY001
AG20239
D007
1SS272
R001 10KΩ
C002 0.01μF
74HC00
U010
D005
R019 3KΩ
R020 100KΩ
C037 1μ/16V
R021 100KΩ
C029 0.01μF
RA001 10KΩ
C004 27PF
C003 27PF
X001 4.9152MHz
U001
HD63A03XF
NMI
IRQ2
HALT
MR
XTAL
EXTAL
MP1 MP0 VCC RES STBY
P25
P26
P27
P23(RX)
P24(TX)
P60
P61
P63
P64
P65
P66
P67
VSS
IRQ1
E
R/W
WR
RD
NC
START
RESET
AD/NEO
GND-D
RX
TX
CTS
RTS
GND
C050 33μ/10V
+5V
+12V
GNDA
-12V
+PUMP
PUMPG
RA002 10KΩ
M54514AP
U019
10KΩX3
R62
R63
R64
X1-X3
2-8A
74HC138
U004
C001 0.01μF
TL7705
U007
RESET
RESIN
CT
Vref
R057 10KΩ
C034 0.1μF
C035 2.2μF/10V
C036 0.01μF
CN005
R059 100KΩ
R058 100KΩ
CN003
D008
D009
D010
D011
M54537P
U020
63A21FP
U005
CS2
CS0
CS1
CA2
CB1
CB2
CA1
PA0-PA7
PB0-PB7
RS0
RS1
IRQA
IRQB
C005 0.01μF
AD7533
U006
VDD
RFB
OUT1
OUT2
BIT10-BIT01
VREF
μPC358 1/2
μPC358 2/2
U011
C033 0.01μF
C032 0.01μF
VREF
2-10B
2-10C
CN006
1200 baud
2400 baud
4800 baud
C051 2.2μF 16V
C031 2.2μF 16V
R025 1KΩ
R026 10KΩ
R022 4.75KΩ
R023 10KΩ
TR004 2SC2712
D006 1SS272
R024 10Ω
C030 10μF/16V
ENL
A00-A15
D00-D07
UR
D001-D011+1SS272
μPD4464G
U003
C027 0.01μF
HD27C256FP
U002
C028 0.01μF
A14
A15
OE
WE
CE1
CF2
VPP
DATA-BUS
CONTROL-BUS
ADDRESS-BUS
A
B
C
D
E
F
G
50
0
10

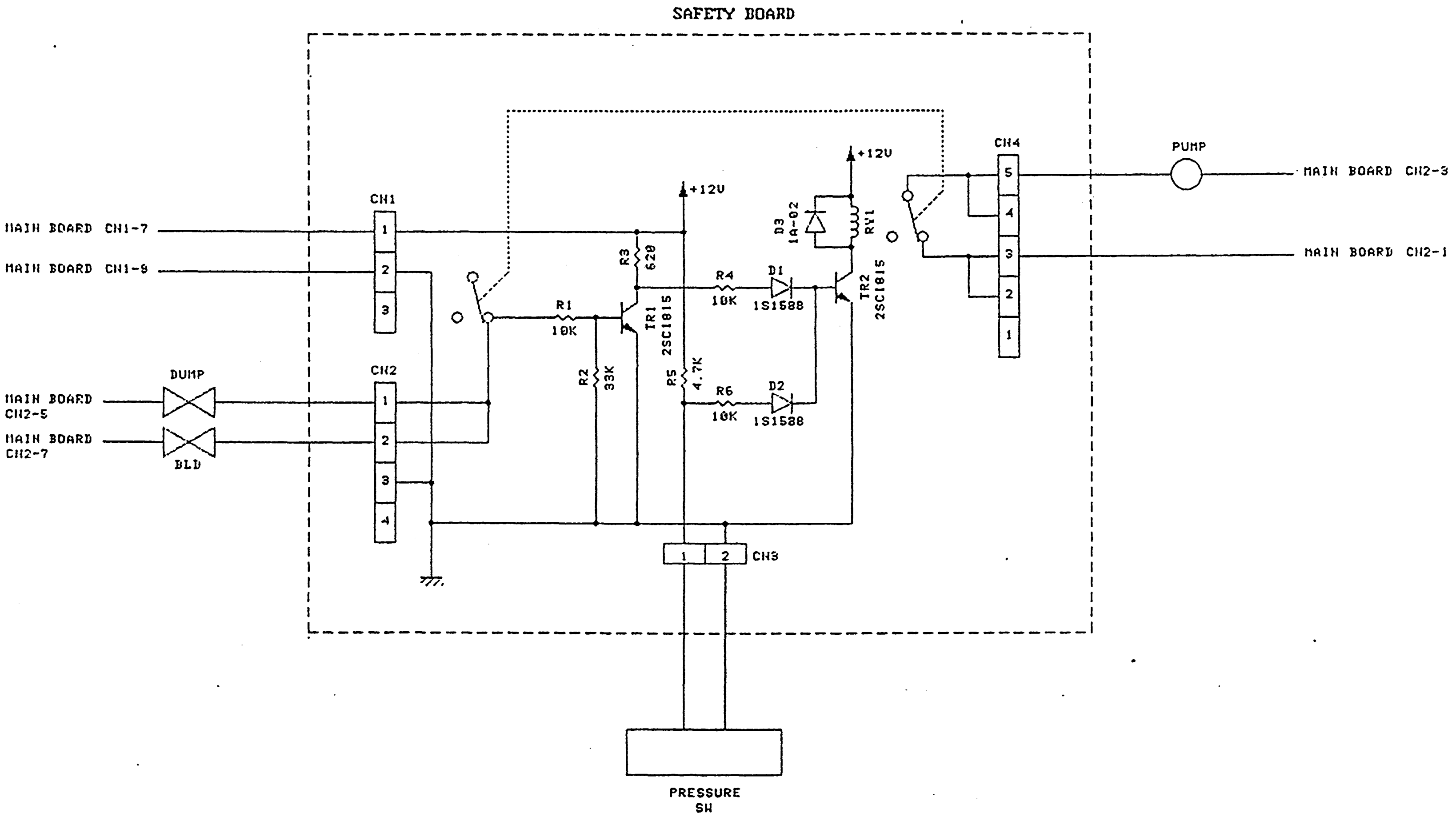
1991年 7月新コードに切替

旧図番 107035 3

△×		- -		承認 APPD	拮尾	図番 DWG NO	0203-026597
△×		- -		検図 2 CHK 2	一	型式 MODEL	AP-712P
△×		- -		検図 1 CHK 1	金藏	名称 NAME	NIBP UNIT 1/3
△×		- -		設計 DESIGN	栗田	日付 DATE	90 - 1 - 30
△×		- -					
△×		- -					
△×		- -					
変更 REVIS	理由 REASON	年月日 DATE	検図 CHK	写図 TRACE	一		日本光電


1991年 7月新コードに切替
旧図番 107036
3
図番 DWG NO 0203-026605
型式 MODEL AP-712P
名称 NAME NIBP UNIT 2/3
日付 DATE 90- 1- 30
日本光電
承認 APPD
検図2 CHK 2
検図1 CHK 1
設計 DESIGN
写図 TRACE
変更 REVIS
理由 REASON
年月日 DATE
検図 CHK
AD574 U008
4053 U009
CONTROL-BUS
ADDRESS-BUS
DATA-BUS
VREF
CS
CH001
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP10 SIN
μPC4560G 8PIN+12V 4PIN+GND
μPC358G 8PIN+12V 4PIN+GND
2SC2712
A1162
TL431
FFM-07FG

添付図	-	-	所属図	-
	-	-		-

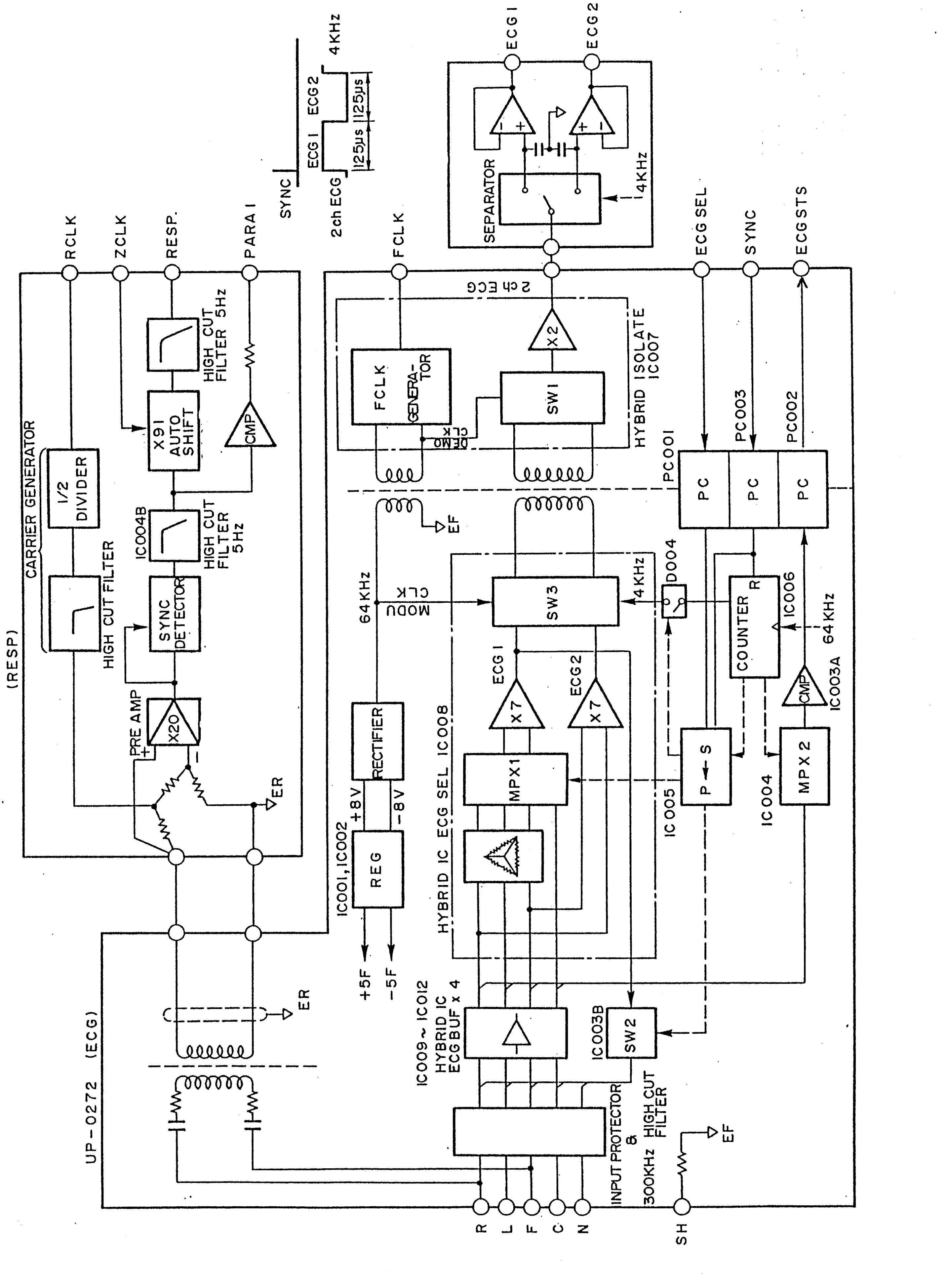

SAFETY BOARD
MAIN BOARD CN1-7
MAIN BOARD CN1-9
MAIN BOARD CN2-5
MAIN BOARD CN2-7
DUMP
DLD
CN1
CN2
CN3
CN4
R1 10K
R2 33K
R3 620
R4 10K
R5 4.7K
R6 10K
D1 1S1588
D2 1S1588
D3 1A-02
RY1
TR1 2SC1815
TR2 2SC1815
+12V
+12V
PUMP
MAIN BOARD CN2-3
MAIN BOARD CN2-1
PRESSURE SW

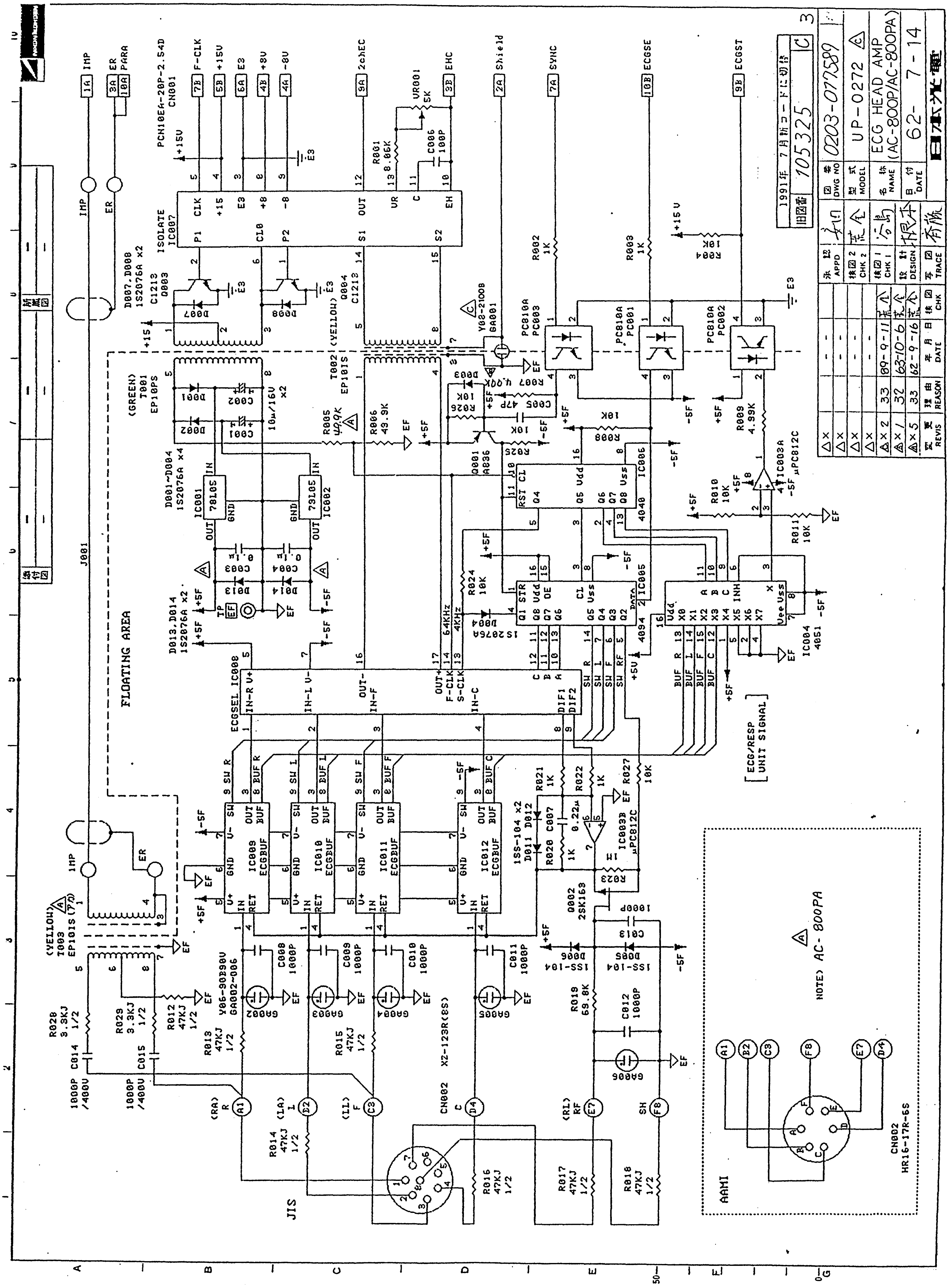
1991年 7月新コードに切替

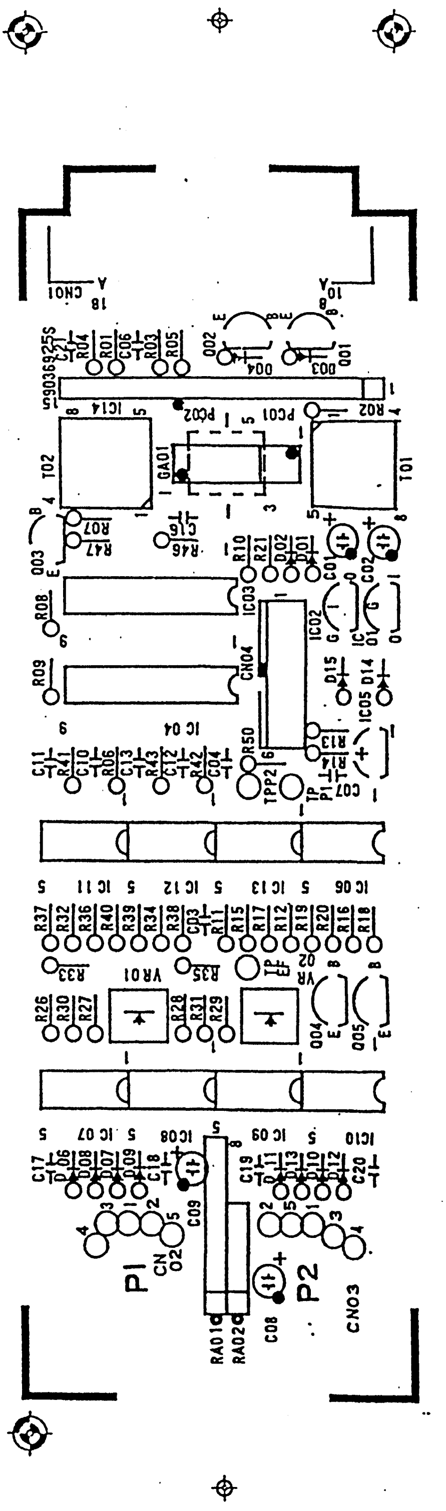
旧図番 107049

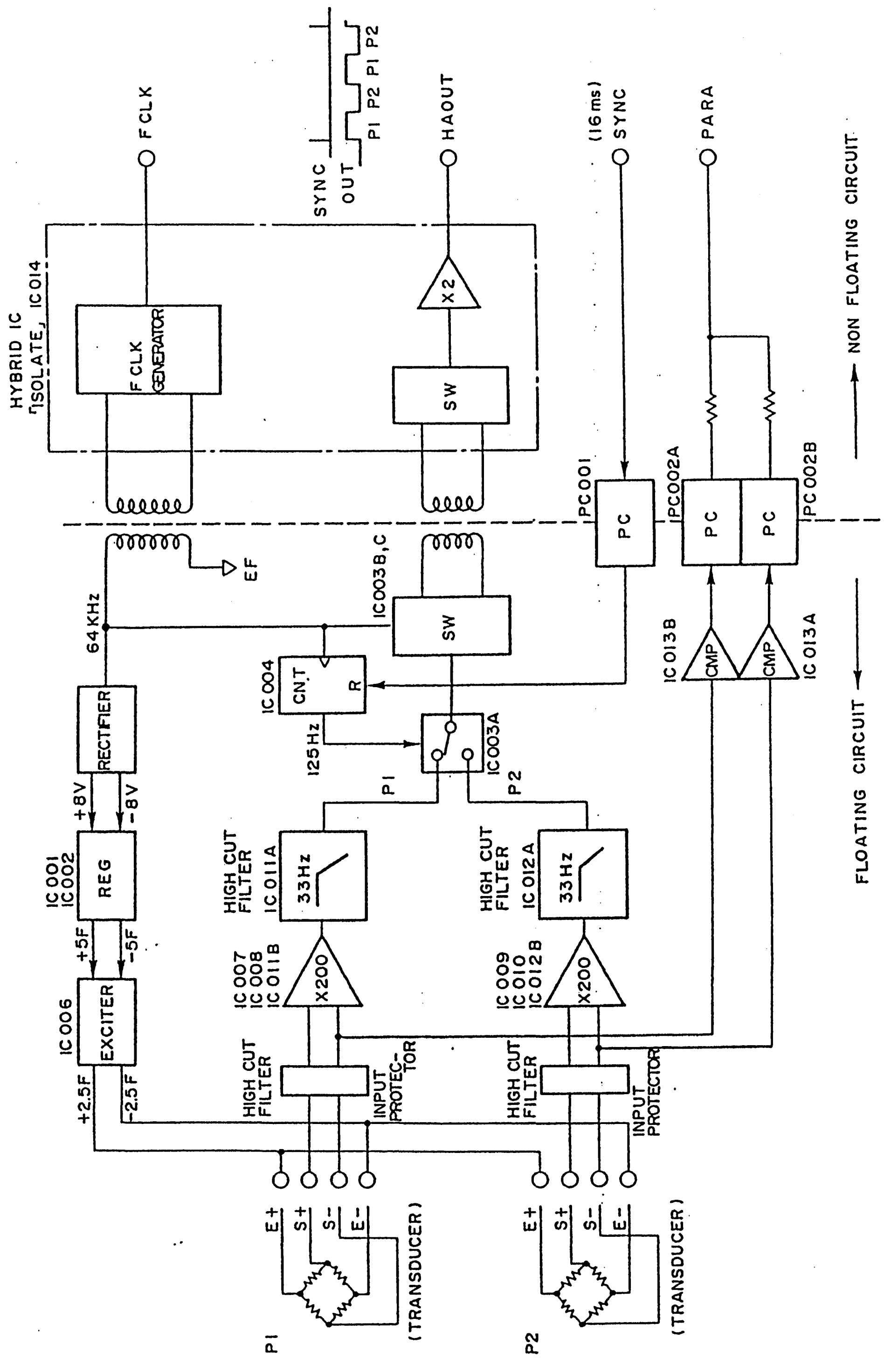
3

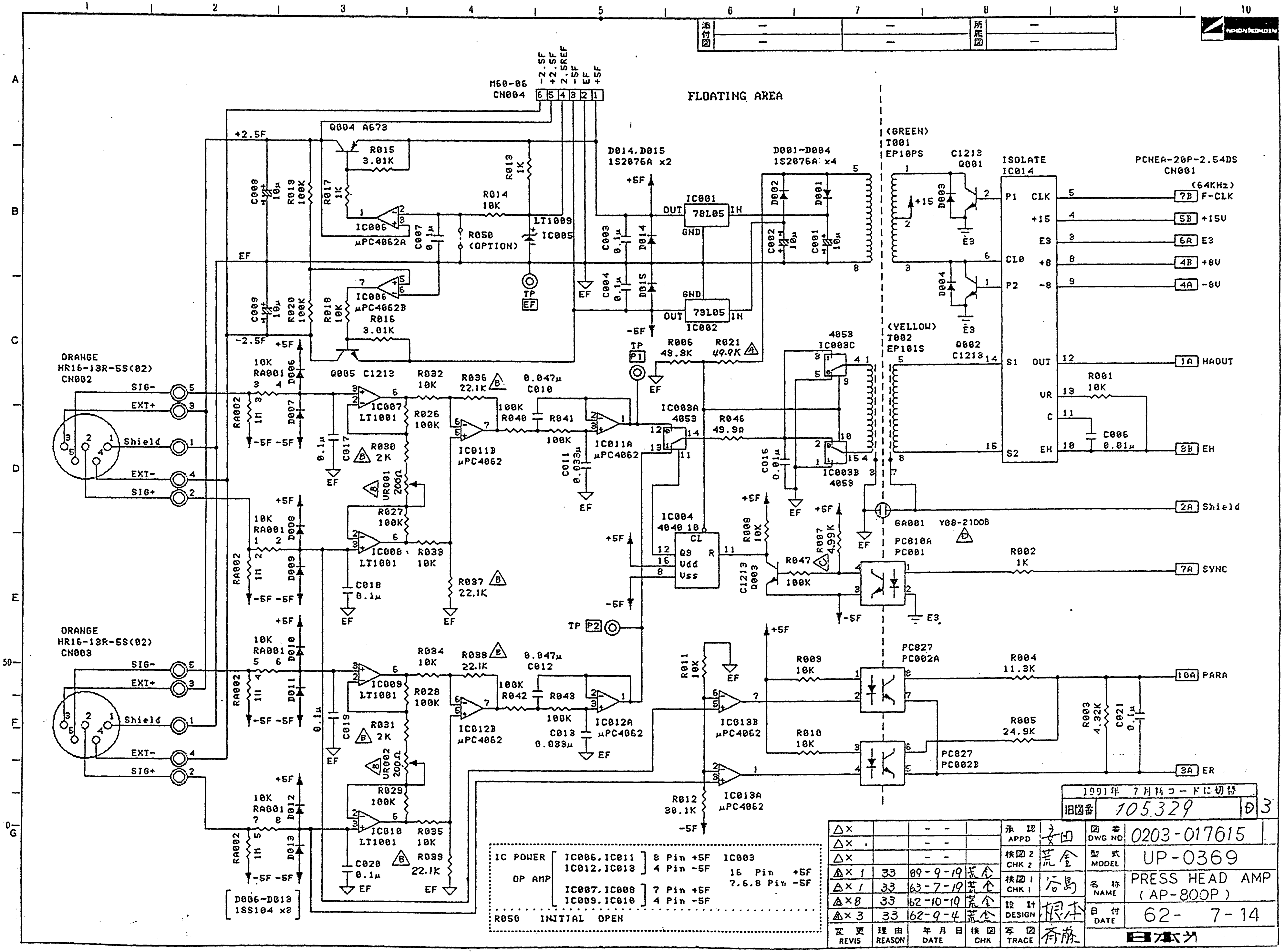
△×		- -		承認 APPD	梶尾	図番 DWG NO	0203-026695
△×		- -		検図2 CHK 2	—	型式 MODEL	AP-712P
△×		- -		検図1 CHK 1	五十嵐	名称 NAME	NIBP UNIT 3/3
△×		- -		設計 DESIGN	栗田	日付 DATE	89 - 11 - 9
△×		- -					
△×		- -					
△×		- -					
変更 REVIS	理由 REASON	年月日 DATE	検図 CHK	写図 TRACE	—		日本光電

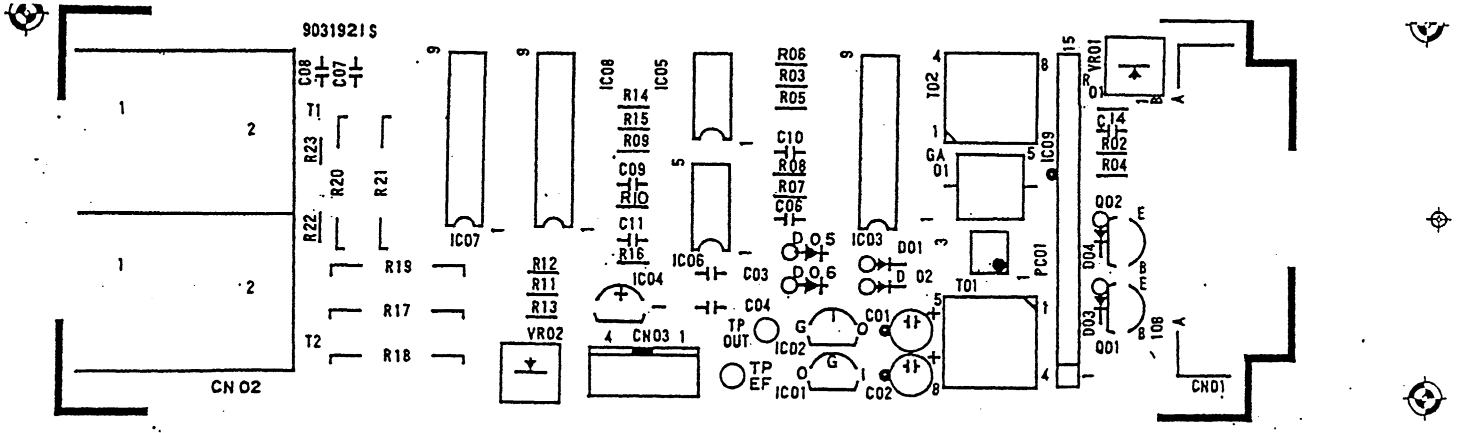

UP-0272 (ECG)
(RESP)
CARRIER GENERATOR
1/2 DIVIDER
HIGH CUT FILTER
PRE AMP
X20
SYNC DETECTOR
IC004B
HIGH CUT FILTER 5Hz
X91 AUTO SHIFT
HIGH CUT FILTER 5Hz
CMP
ER
RCLK
ZCLK
RESP.
PARA I
SYNC
2ch ECG
ECG I
ECG2
125μs
125μs
4KHz
FCLK
FCLK GENERA-TOR
DEMO CLK
SW1
X2
2ch ECG
HYBRID ISOLATE IC007
SEPARATOR
4KHz
ECG I
ECG 2
ECG SEL
SYNC
ECG STS
PC001
PC003
PC002
PC
PC
PC
EF
64KHz
MODU CLK
SW3
4KHz
D004
COUNTER
R
IC006
64KHz
ECG I
ECG 2
X7
X7
CMP
IC003A
MPX1
P ← S
IC005
IC004
MPX 2
RECTIFIER
+8V
-8V
REG
IC001, IC002
HYBRID IC ECG SEL IC008
+5F
-5F
IC009 ~ IC012
HYBRID IC ECGBUF x 4
IC003B
SW2
ER
INPUT PROTECTOR &
300KHz HIGH CUT FILTER
EF
R
L
F
C
N
SH

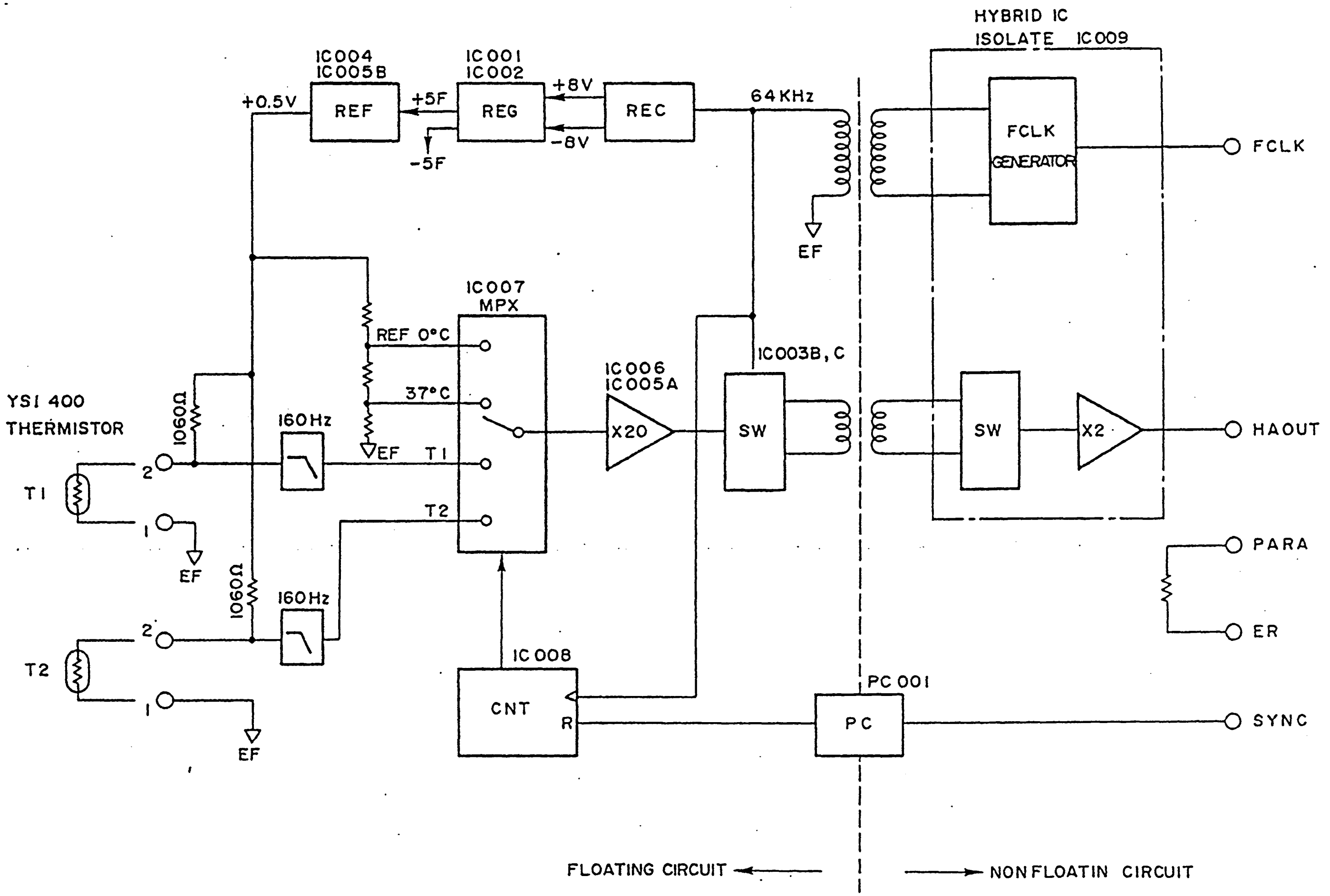

ECG HEAD AMP
(AC-800P/AC-800PA)
UP-0272
0203-077589
105325
62- 7-14
1991年 7月新コードに切替
旧図番
FLOATING AREA
ECG/RESP UNIT SIGNAL
NOTE) AC- 800PA
JIS
AAMI
ISOLATE IC007
ECGSEL IC008
IC001 78L05
IC002 79L05
IC004 4051
IC005 4094
IC006 4040
IC009 ECGBUF
IC010 ECGBUF
IC011 ECGBUF
IC012 ECGBUF
IC003A μPC812C
IC003B μPC812C
PC810A PC001
PC810A PC002
PC810A PC003
T001 EP10PS (GREEN)
T002 EP101S (YELLOW)
T003 EP101S (YELLOW)
CN001 PCN10EA-20P-2.54D
CN002 XZ-123R(8S)
CN002 HR16-17R-6S
J001
IMP
ER
PARA
F-CLK
+15V
E3
+8V
-8V
2chEC
EHC
Shield
SYNC
ECGSE
ECGST
+5F
-5F
EF

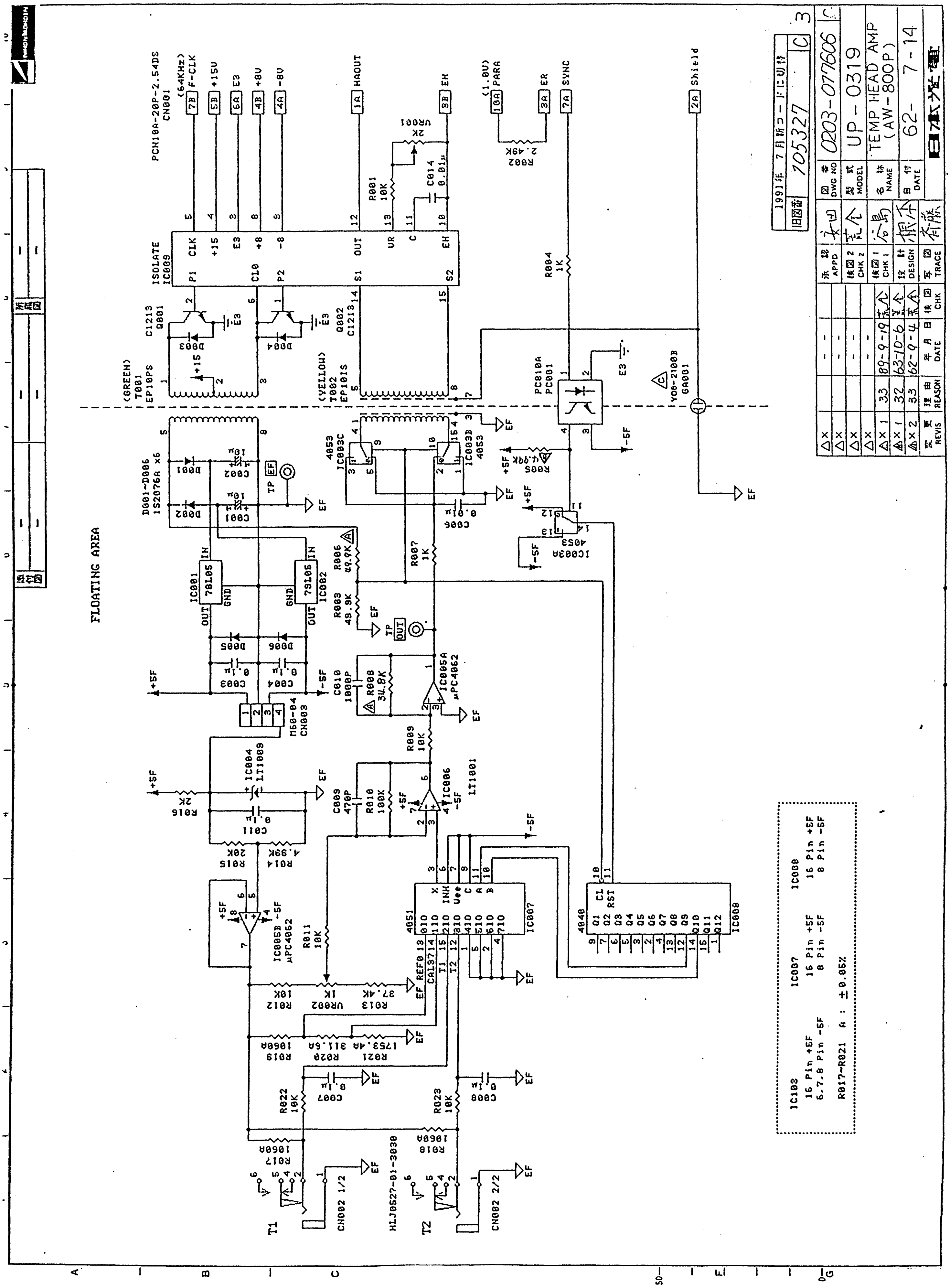

CN01
18
1A
10B
S90369255
IC14
PC02
PC01
R02
T02
T01
GA01
Q01
Q02
Q03
D03
D04
R01
R03
R04
R05
C06
C21
R07
R47
R46
C16
R08
R09
R10
R21
D01
D02
C01
C02
IC03
IC02
CN04
IC04
D14
D15
IC05
C03
R50
TP P1
TPP2
C11
R41
C10
R06
C13
R43
C12
R42
C04
IC11
IC12
IC13
IC06
R37
R32
R36
R40
R39
R34
R38
R11
R15
R17
R12
R19
R20
R16
R18
R33
R35
VR01
VR02
TP EF
R26
R30
R27
R28
R31
R29
Q04
Q05
IC07
IC08
IC09
IC10
C17
D06
D08
D07
D09
C18
C09
C19
D11
D13
D10
D12
C20
P1
CN02
P2
CN03
C08
RA01
RA02

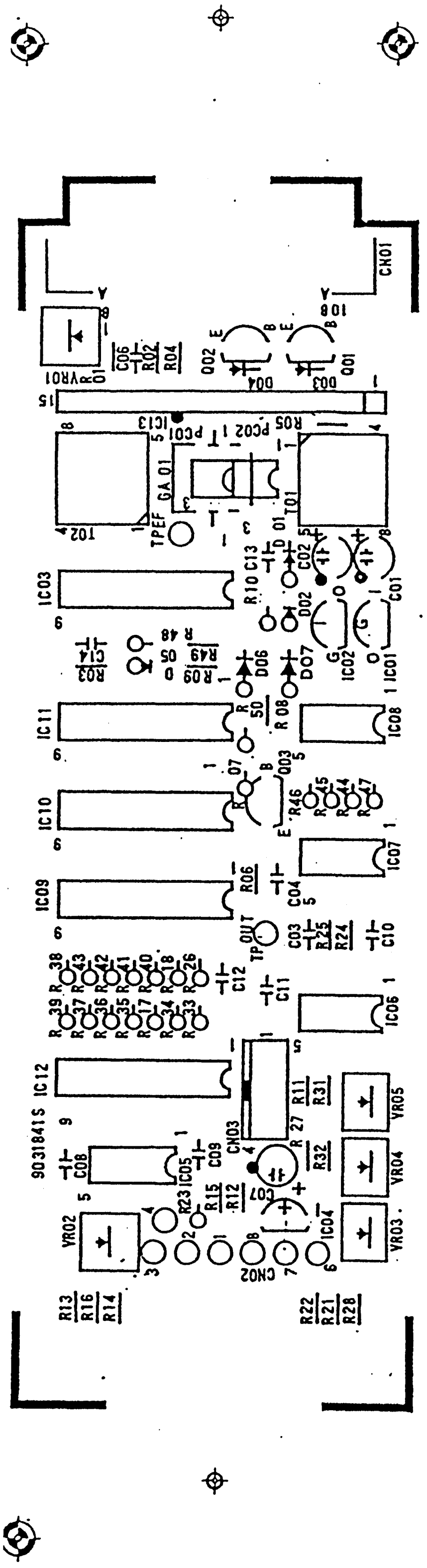

HYBRID IC
(ISOLATE) IC014
F CLK GENERATOR
FCLK
SYNC
OUT
P1 P2 P1 P2
HAOUT
X2
SW
(16 ms) SYNC
PARA
PC001
PC002A
PC002B
PC
PC
PC
NON FLOATING CIRCUIT
FLOATING CIRCUIT
IC013B
IC013A
CMP
CMP
EF
IC003B,C
SW
64 KHz
RECTIFIER
IC004
CNT
R
125Hz
IC003A
P1
P2
+8V
-8V
IC001
IC002
REG
+5F
-5F
IC006
EXCITER
+2.5F
-2.5F
HIGH CUT FILTER
IC011A
33Hz
HIGH CUT FILTER
IC012A
33Hz
IC007
IC008
IC011B
X200
IC009
IC010
IC012B
X200
HIGH CUT FILTER
INPUT PROTECTOR
HIGH CUT FILTER
INPUT PROTECTOR
E+
S+
S-
E-
(TRANSDUCER)
P1
E+
S+
S-
E-
(TRANSDUCER)
P2


FLOATING AREA
M60-06
CN004
-2.5F
+2.5F
2.5REF
-5F
EF
+5F
Q004 A673
R015 3.01K
R017 1K
R013 1K
R014 10K
IC006 μPC4062A
C007 0.1μ
R050 (OPTION)
LT1009 IC005
TP EF
C008 10μ
R019 100K
C009 10μ
R020 100K
R018 10K
IC006 μPC4062B
R016 3.01K
Q005 C1213
D014, D015 1S2076A x2
IC001 78L05
IC002 79L05
OUT
IN
GND
C003 0.1μ
C004 0.1μ
D001~D004 1S2076A x4
C001 10μ
C002 10μ
(GREEN) T001 EP10PS
(YELLOW) T002 EP101S
C1213 Q001
Q002 C1213
D003
D004
ISOLATE IC014
P1 CLK
+15
E3
CL0 +8
P2 -8
S1 OUT
VR
C
S2 EH
PCNEA-20P-2.54DS CN001
(64KHz)
7B F-CLK
5B +15V
6A E3
4B +8V
4A -8V
1A HAOUT
R001 10K
C006 0.01μ
3B EH
2A Shield
GA001 Y08-2100B
PC810A PC001
R002 1K
7A SYNC
ORANGE HR16-13R-5S(02) CN002
ORANGE HR16-13R-5S(02) CN003
SIG-
EXT+
Shield
EXT-
SIG+
RA001 10K
RA002 1M
D006~D013 1SS104 x8
IC007 LT1001
IC008 LT1001
IC009 LT1001
IC010 LT1001
C017 0.1μ
C018 0.1μ
C019 0.1μ
C020 0.1μ
R030 2K
R031 2K
VR001 200Ω
VR002 200Ω
R026 100K
R027 100K
R028 100K
R029 100K
R032 10K
R033 10K
R034 10K
R035 10K
R036 22.1K
R037 22.1K
R038 22.1K
R039 22.1K
IC011B μPC4062
IC011A μPC4062
IC012B μPC4062
IC012A μPC4062
R040 100K
R041 100K
R042 100K
R043 100K
C010 0.047μ
C012 0.047μ
C011 0.033μ
C013 0.033μ
TP P1
TP P2
R006 49.9K
R021 49.9K
R046 49.9Ω
IC003A 4053
IC003B 4053
IC003C 4053
C016 0.01μ
IC004 4040
CL Q9 Vdd Vss R
C1213 Q003
R008 10K
R007 4.99K
R047 100K
PC827 PC002A
PC827 PC002B
R009 10K
R010 10K
R011 10K
R012 30.1K
IC013B μPC4062
IC013A μPC4062
R004 11.3K
R005 24.9K
R003 4.32K
C021 0.1μ
10A PARA
3A ER
IC POWER [IC006, IC011 / IC012, IC013] 8 Pin +5F / 4 Pin -5F IC003 16 Pin +5F / 7.6.8 Pin -5F
OP AMP [IC007, IC008 / IC009, IC010] 7 Pin +5F / 4 Pin -5F
R050 INITIAL OPEN
添付図
所属図
1991年 7月新コードに切替
旧図番 105329 D 3
△x
△x
△x
△x 1 33 89-9-19 荒金
△x 1 33 63-7-19 荒金
△x 8 33 62-10-19 荒金
△x 3 33 62-9-4 荒金
変更 REVIS
理由 REASON
年月日 DATE
検図 CHK
承認 APPD 安田
検図2 CHK 2 荒金
検図1 CHK 1 谷島
設計 DESIGN 根本
写図 TRACE 斉藤
図番 DWG NO 0203-017615
型式 MODEL UP-0369
名称 NAME PRESS HEAD AMP (AP-800P)
日付 DATE 62- 7-14
日本光電

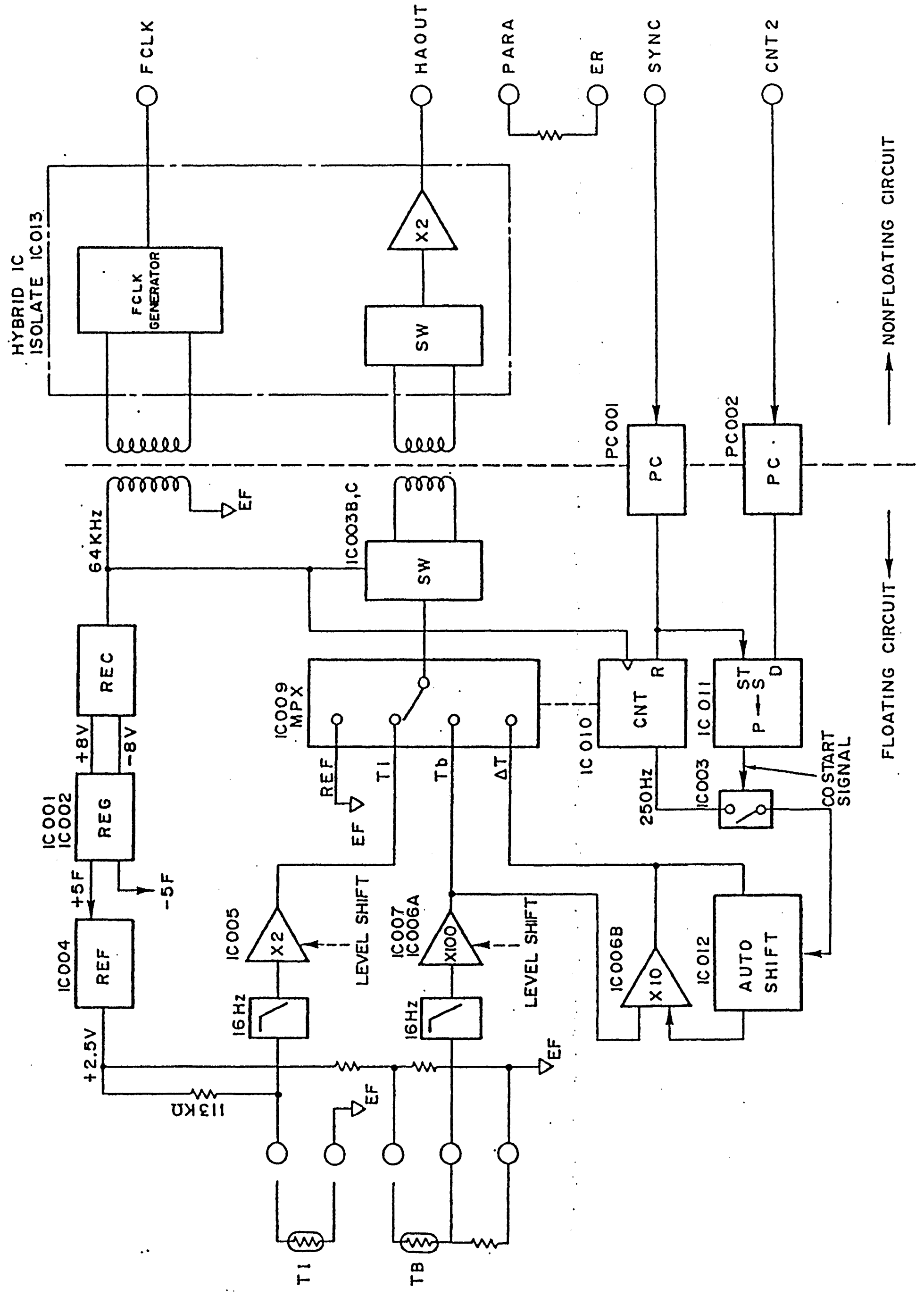

9031921S
CN02
CN01
CN03
VR01
VR02
IC01
IC02
IC03
IC04
IC05
IC06
IC07
IC08
IC09
T01
T02
PC01
Q01
Q02
GA01
TP OUT
TP EF
R19
R17
R18
T1
T2


HYBRID IC
ISOLATE IC009
FCLK GENERATOR
FCLK
SW
X2
HAOUT
PARA
ER
SYNC
PC001
PC
IC004
IC005B
REF
+0.5V
IC001
IC002
REG
+5F
-5F
+8V
-8V
REC
64KHz
EF
IC007
MPX
REF 0°C
37°C
T1
T2
IC006
IC005A
X20
IC003B, C
SW
IC008
CNT
R
YSI 400
THERMISTOR
T1
T2
1060Ω
1060Ω
160Hz
160Hz
FLOATING CIRCUIT
NONFLOATIN CIRCUIT

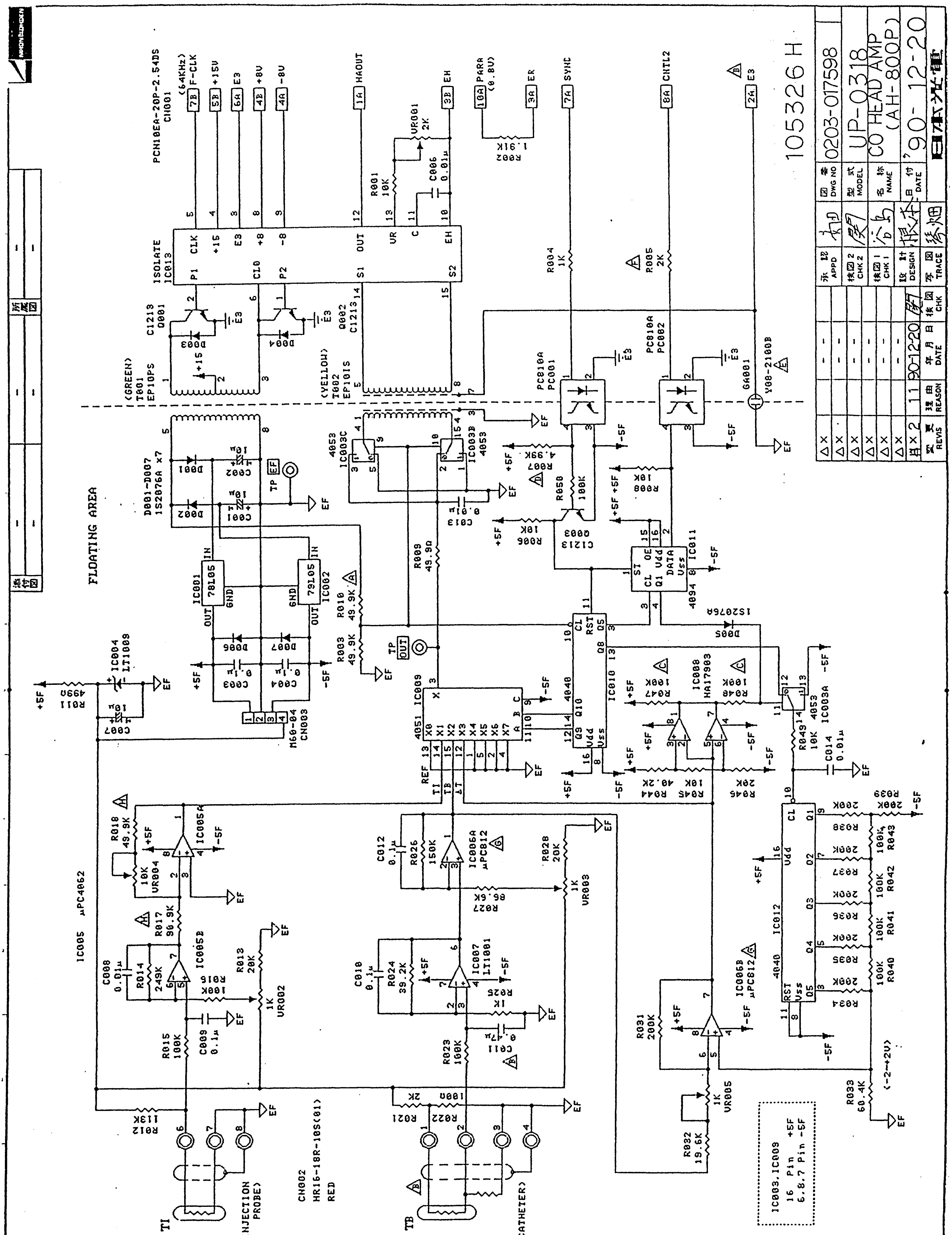

FLOATING AREA
PCN10A-20P-2.54DS CN001
(64KHz) F-CLK
+15V
E3
+8V
-8V
HAOUT
EH
(1.0V) PARA
ER
SYNC
Shield
ISOLATE IC009
CLK
+15
E3
+8
-8
OUT
VR
C
EH
P1
C10
P2
S1
S2
UR001 2K
R001 10K
C014 0.01µ
R002 2.49K
R004 1K
C1213 Q001
Q002 C1213
D003
D004
(GREEN) T001 EP10PS
(YELLOW) T002 EP101S
PC810A PC001
Y08-2100B GA001
D001~D006 1S2076A x6
C001
C002
TP EF
TP OUT
IC001 78L05
IC002 79L05
D005
D006
C003 0.1µ
C004 0.1µ
M60-04 CN003
4053 IC003C
IC003B 4053
IC003A 4053
C006 0.01µ
R005 4.99K
R006 49.9K
R007 1K
R003 49.9K
C010 1000P
R008 34.8K
IC005A µPC4062
R009 10K
IC004 LT1009
R016 2K
C011 0.1µ
R015 20K
R014 4.99K
C009 470P
R010 100K
IC006 LT1001
IC005B µPC4062
R011 10K
4051 IC007
INH
Vee
REF0
CAL
T1
T2
4040 IC008
CL
RST
R012 10K
UR002 1K
R013 37.4K
R019 1060A
R020 311.6A
R021 1753.4A
C007 0.1µ
C008 0.1µ
R022 10K
R023 10K
R017 1060A
R018 1060A
HLJ0527-01-3030
CN002 1/2
CN002 2/2
T1
T2
+5F
-5F
EF
E3
IC103 16 Pin +5F 6,7,8 Pin -5F
IC007 16 Pin +5F 8 Pin -5F
IC008 16 Pin +5F 8 Pin -5F
R017~R021 A : ±0.05%
1991年 7月統一に切替
旧図番 105327
C 3
図番 DWG NO 0203-077606
型式 MODEL UP-0319
名称 NAME TEMP HEAD AMP (AW-800P)
日付 DATE 62- 7-14
承認 APPD
検図2 CHK 2
検図1 CHK 1
設計 DESIGN
写図 TRACE
33 89-9-19
32 63-10-6
33 62-9-4
変更 REVIS
理由 REASON
年月日 DATE
検図 CHK
日本光電



CN01
CN02
CN03
VR01
VR02
VR03
VR04
VR05
IC03
IC05
IC06
IC07
IC08
IC09
IC10
IC11
IC12
IC13
T01
T02
TPEF
TP OUT
9031841S



FCLK
HAOUT
PARA
ER
SYNC
CNT2
HYBRID IC
ISOLATE IC013
FCLK GENERATOR
X2
SW
PC001
PC002
PC
IC003B,C
64KHz
EF
REC
+8V
-8V
IC001
IC002
REG
+5F
-5F
IC004
REF
+2.5V
113KΩ
IC009
MPX
REF
TI
Tb
ΔT
IC010
CNT
R
IC011
ST
P→S
D
250Hz
IC003
COSTART SIGNAL
IC005
LEVEL SHIFT
IC007
IC006A
X100
IC006B
X10
IC012
AUTO SHIFT
16Hz
TI
TB
NONFLOATING CIRCUIT
FLOATING CIRCUIT


FLOATING AREA
PCN10EA-20P-2.54DS
CN001
(64KHz) F-CLK
+15V
E3
+8V
-8V
HAOUT
EH
PARA (0.8V)
ER
SYNC
CNTL2
E3
ISOLATE
IC013
CLK
+15
E3
+8
-8
OUT
VR
C
EH
P1
CL0
P2
S1
S2
R001 10K
VR001 2K
C006 0.01μ
R002 1.91K
R004 1K
R005 2K
C1213 Q001
C1213 Q002
D003
D004
(GREEN) T001 EP10PS
(YELLOW) T002 EP101S
PC810A PC001
PC810A PC002
GA001
Y08-2100B
EF
-5F
+5F
D001-D007
1S2076A x7
D001
D002
C001 10μ
C002 10μ
TP EF
4053 IC003C
IC003B 4053
C013 0.01μ
R007 4.99K
R050 100K
R006 10K
Q003 C1213
R008 10K
IC011
4094
ST OE
CL Vdd
Q1 DATA
Vss
D005 1S2076A
IC001 78L05
IC002 79L05
IN
GND
OUT
D006
D007
C003 0.1μ
C004 0.1μ
R009 49.9Ω
R010 49.9K
R003 49.9K
TP OUT
IC004 LT1009
R011 499Ω
C007 10μ
CN003 M60-04
IC009 4051
X0 X1 X2 X3 X4 X5 X6 X7
A B C
REF
TI
TB
ΔT
IC010 4040
CL RST Q5 Q8 Q10 Q9 Vdd Vss
IC008 HA17903
R047 100K
R048 100K
R044 40.2K
R045 10K
R046 20K
IC003A 4053
R049 10K
C014 0.01μ
IC005 μPC4062
IC005A
IC005B
R018 49.9K
VR004 10K
R017 90.9K
R014 249K
C008 0.01μ
R016 100K
R013 20K
VR002 1K
R015 100K
C009 0.1μ
R012 113K
C012 0.1μ
R026 150K
IC006A μPC812
R028 20K
VR003 1K
R027 86.6K
C010 0.1μ
R024 39.2K
IC007 LT1001
R025 1K
C011 0.47μ
R023 100K
R021 2K
R022 100Ω
IC006B μPC812
R031 200K
VR005 1K
R032 19.6K
IC012 4040
CL Q1 Q2 Q3 Q4 Q5 Vdd RST Vss
R039 200K
R038 200K
R037 200K
R036 200K
R035 200K
R034 200K
R043 100K
R042 100K
R041 100K
R040 100K
R033 60.4K
(-2~+2V)
CN002
HR16-18R-10S(01)
RED
TI
(INJECTION PROBE)
TB
(CATHETER)
IC003, IC009
16 Pin +5F
6,8,7 Pin -5F
A B C D E F G
添付図
所属図

105326 H

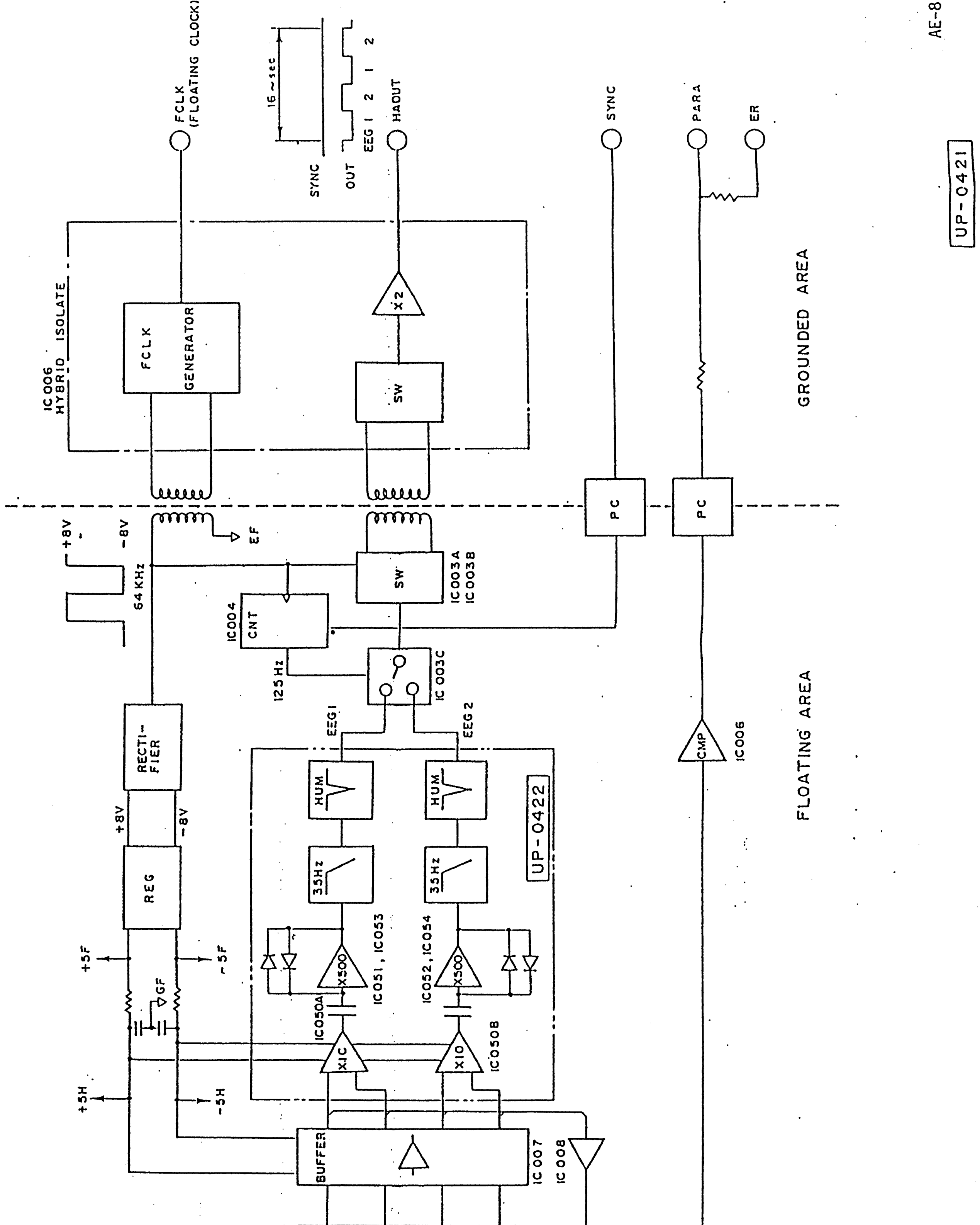
図番 DWG NO	0203-017598
型式 MODEL	UP-0318
名称 NAME	CO HEAD AMP (AH-800P)
日付 DATE	'90-12-20

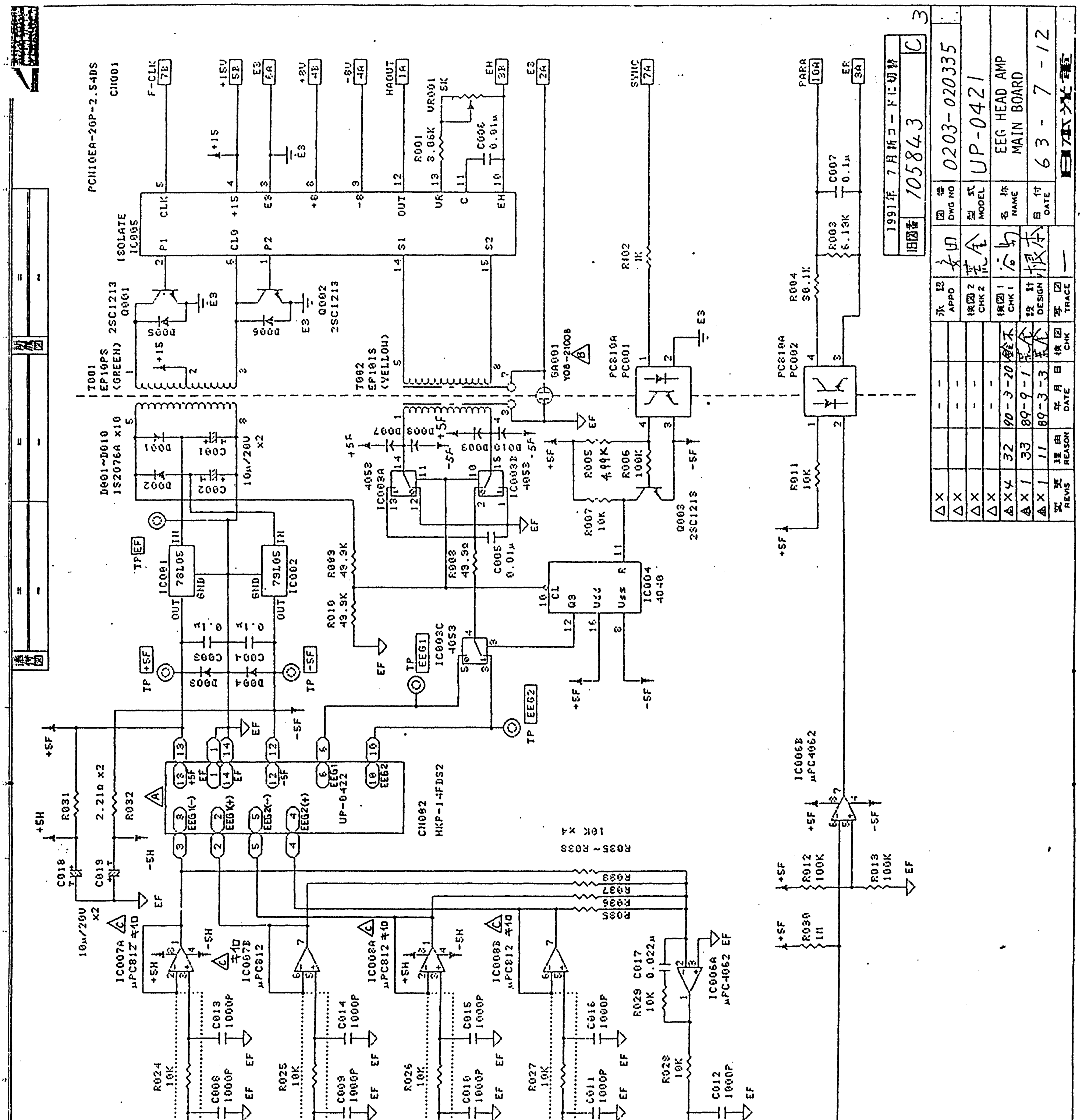
日本光電

承認 APPD	検図2 CHK 2	検図1 CHK 1	設計 DESIGN	写図 TRACE
向	関	谷島	根本	後畑

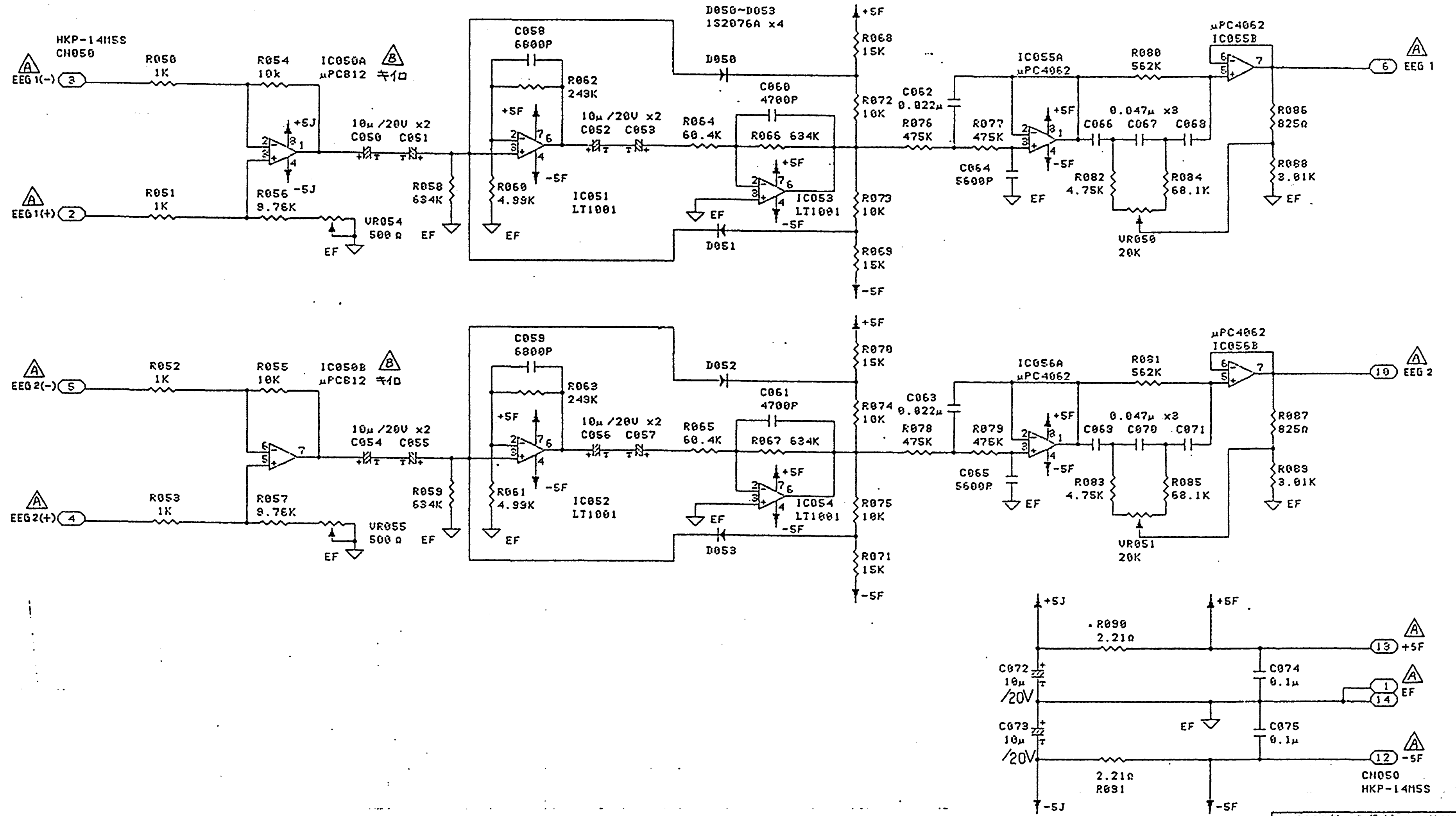
変更 REVIS	理由 REASON	年月日 DATE	検図 CHK
Δ×		- -	
Δ×		- -	
Δ×		- -	
Δ×		- -	
Δ×		- -	
Δ×		- -	
白×2	11	90-12-20	関

AE-800PA Block diagram


UP-0421
UP-0422
IC006 HYBRID ISOLATE
FCLK GENERATOR
FCLK (FLOATING CLOCK)
SYNC
OUT
16 ~ sec
EEG 1 2 1 2
HADUT
X2
SW
SYNC
PARA
ER
GROUNDED AREA
FLOATING AREA
+8V
-8V
64 KHz
EF
PC
PC
SW
IC003A
IC003B
IC004
CNT
125 Hz
IC003C
EEG1
EEG2
CMP
IC006
RECTI-FIER
+8V
-8V
REG
HUM
HUM
35Hz
35Hz
X500
X500
IC051, IC053
IC052, IC054
IC050A
IC050B
X10
X10
+5F
-5F
GF
+5H
-5H
BUFFER
IC007
IC008
PRTECTOR & FILTER
G1(-)
G2(+)
G1(-)
G2(+)
N
MEAS
EEG1
EEG2


EEG HEAD AMP
MAIN BOARD
UP-0421
0203-020335
105843
1991年 7月 所コード切替
63 - 7 - 12
CH001 PCN10EA-20P-2.54DS
ISOLATE IC005
T001 EP10PS (GREEN)
T002 EP10IS (YELLOW)
IC001 7805
IC002 7905
IC003A 4053
IC003B 4053
IC003C 4053
IC004 4040
PC001 PC810A
PC002 PC810A
CH002 HKP-14FDS2
UP-0422
CH003 HR16-10R-10S(04) (GREEN)
IC006A μPC4062
IC006B μPC4062
IC007A μPC812
IC007B μPC812
IC008A μPC812
IC008B μPC812
D030~D039 1SS104 x10
D001~D010 1S2076A x10
R035~R038 10K x4
F-CLK
+15V
E3
+8V
-8V
HAOUT
EH
SYNC
PARA
ER
NEAS

添付図	–	–	所属図	–
	–	–		–


HKP-14MSS
CN050
EEG1(-) 3
EEG1(+) 2
EEG2(-) 5
EEG2(+) 4
R050 1K
R051 1K
R052 1K
R053 1K
R054 10k
R055 10K
R056 9.76K
R057 9.76K
IC050A μPC812 キイロ
IC050B μPC812 キイロ
+5J
-5J
VR054 500 Ω
VR055 500 Ω
EF
10μ/20V x2
C050 C051
C054 C055
R058 634K
R059 634K
C058 6800P
C059 6800P
R062 243K
R063 243K
+5F
-5F
R060 4.99K
R061 4.99K
IC051 LT1001
IC052 LT1001
10μ/20V x2
C052 C053
C056 C057
R064 60.4K
R065 60.4K
C060 4700P
C061 4700P
R066 634K
R067 634K
IC053 LT1001
IC054 LT1001
D050~D053
1S2076A x4
D050
D051
D052
D053
R068 15K
R069 15K
R070 15K
R071 15K
R072 10K
R073 10K
R074 10K
R075 10K
C062 0.022μ
C063 0.022μ
R076 475K
R077 475K
R078 475K
R079 475K
C064 5600P
C065 5600P
IC055A μPC4062
IC056A μPC4062
R080 562K
R081 562K
0.047μ x3
C066 C067 C068
C069 C070 C071
R082 4.75K
R083 4.75K
R084 68.1K
R085 68.1K
VR050 20K
VR051 20K
μPC4062
IC055B
IC056B
R086 825Ω
R087 825Ω
R088 3.01K
R089 3.01K
6 EEG 1
10 EEG 2
+5J
-5J
R090 2.21Ω
R091 2.21Ω
C072 10μ /20V
C073 10μ /20V
C074 0.1μ
C075 0.1μ
13 +5F
1 14 EF
12 -5F
CN050
HKP-14MSS

3

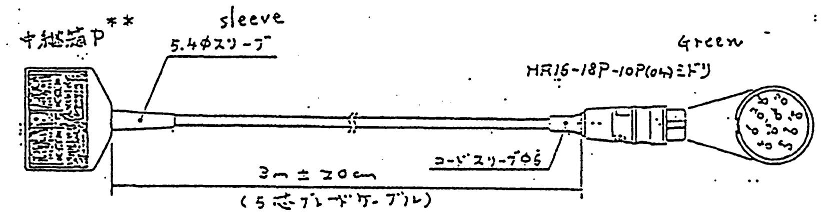
1991年 7月新コードに切替

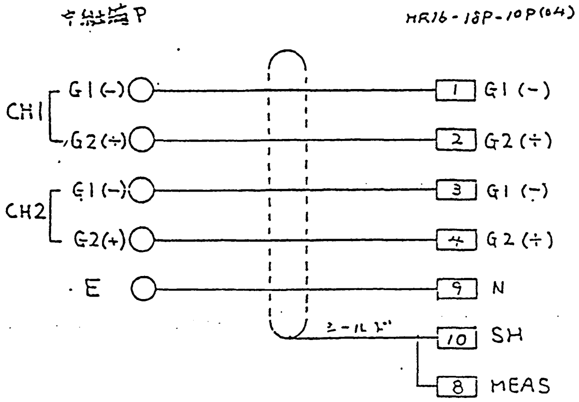
旧図番	105844	B

変更 REVIS	理由 REASON	年月日 DATE	検図 CHK
△×		– –	
△×		– –	
△×		– –	
△×		– –	
△×		– –	
△×2	32	90-3-20	鈴木
△×9	11	89-3-7	荒金

承認 APPO	[illegible]	図番 DWG NO	0203-020344
検図2 CHK 2	荒金	型式 MODEL	UP-0422
検図1 CHK 1	谷島	名称 NAME	EEG HEAD AMP SUB BOARD
設計 DESIGN	[illegible]	日付 DATE	63-4-4
写図 TRACE	—		日本光電

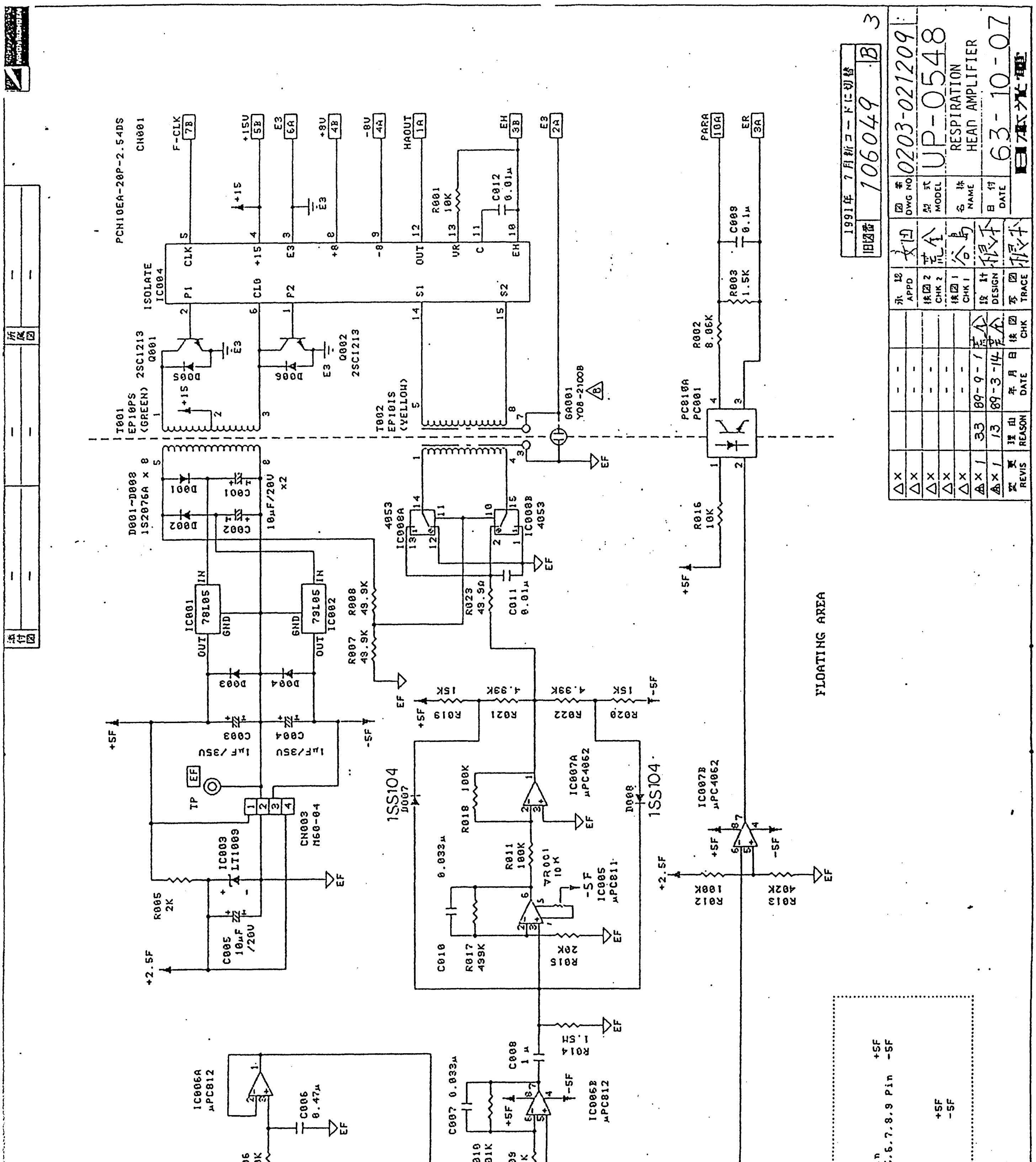
承認	–	承認	–
	–		–

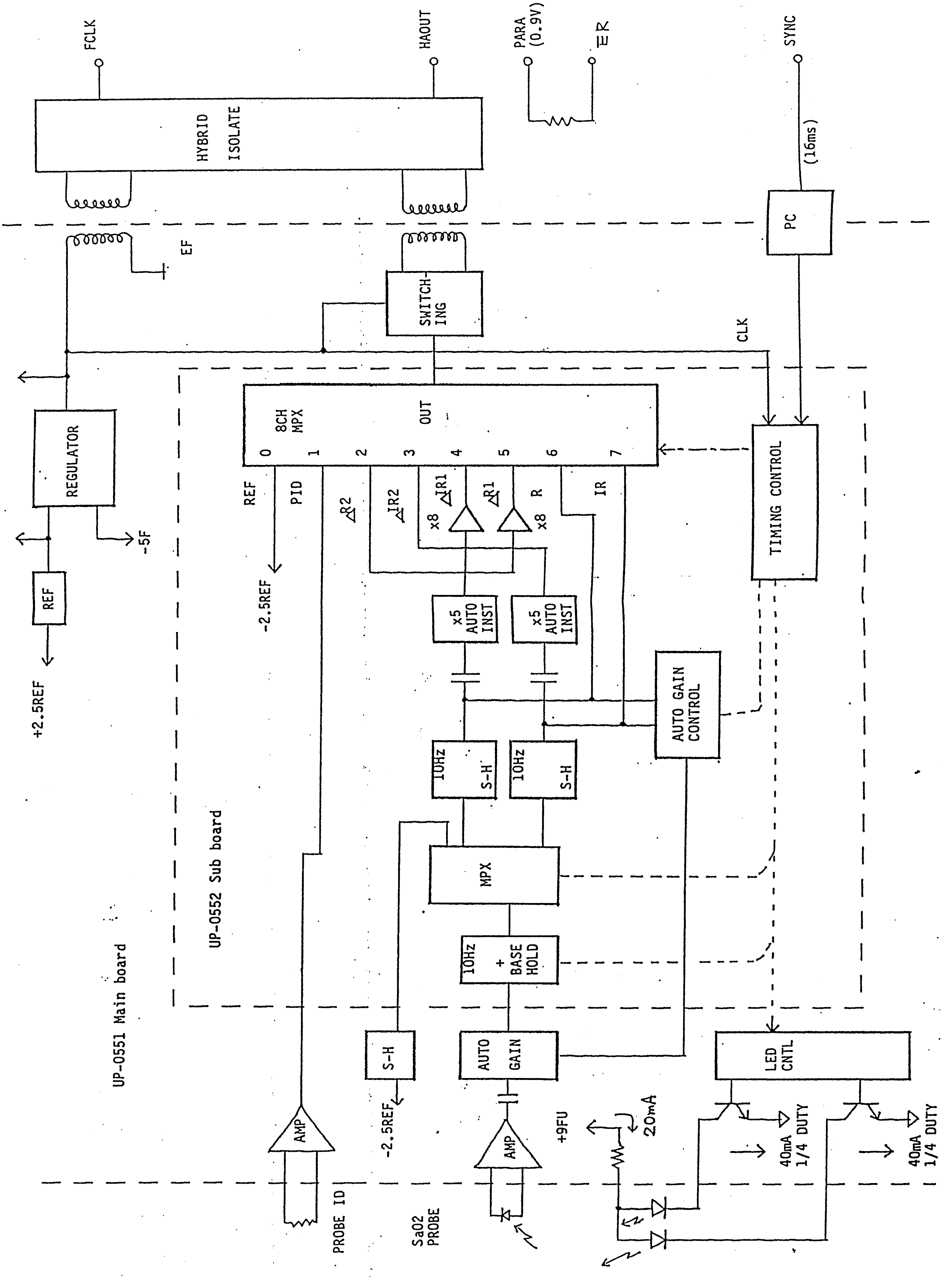

中継箱P＊＊
sleeve
5.4φスリーブ
Green
HR16-18P-10P(04)ミドリ
コードスリーブφ6
3m ± 20cm
（5芯ブレードケーブル）

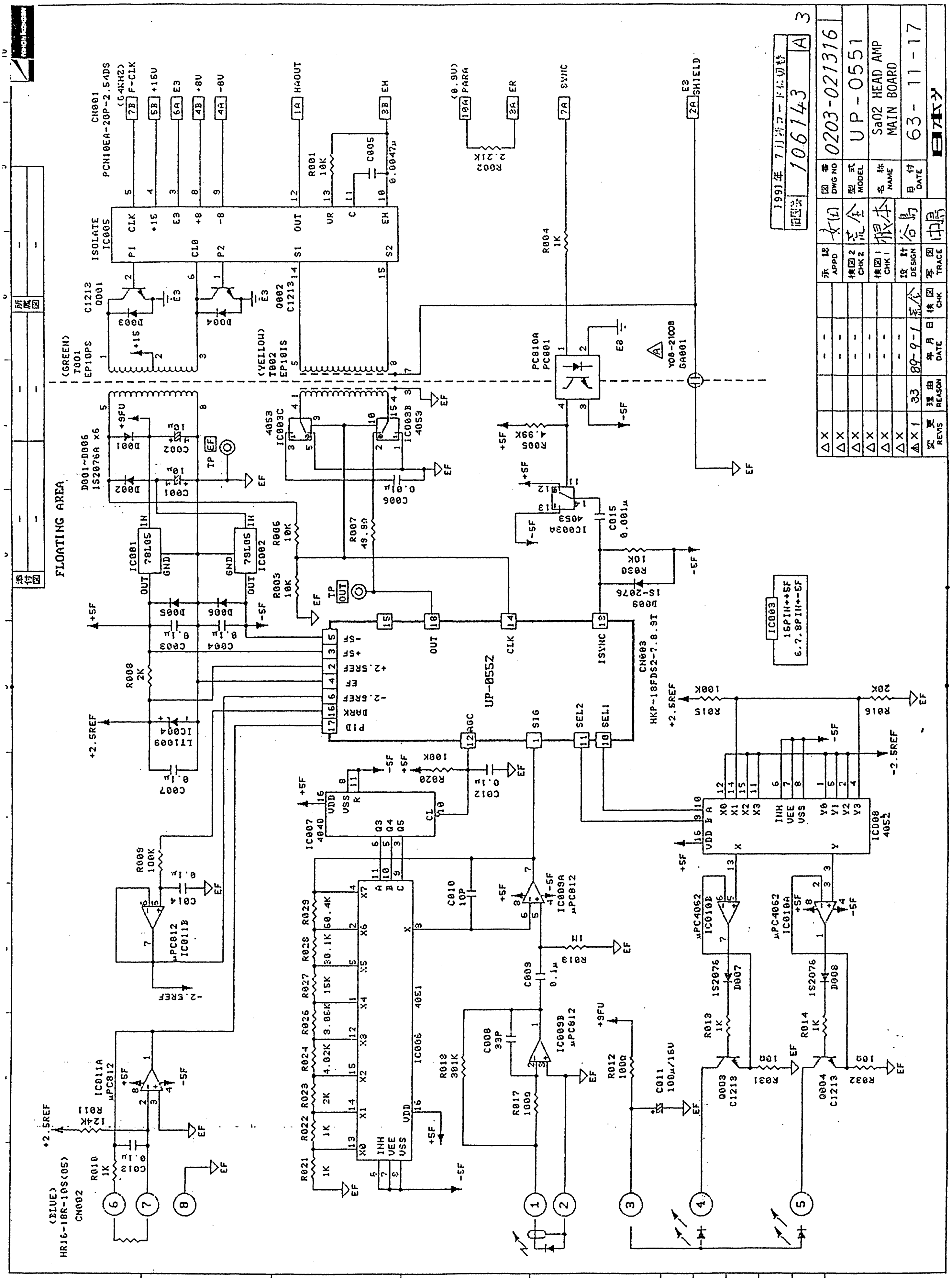

中継箱P
HR16-18P-10P(04)
CH1
G1(-)
G2(+)
CH2
G1(-)
G2(+)
E
シールド
1 G1 (-)
2 G2 (+)
3 G1 (-)
4 G2 (+)
9 N
10 SH
8 MEAS

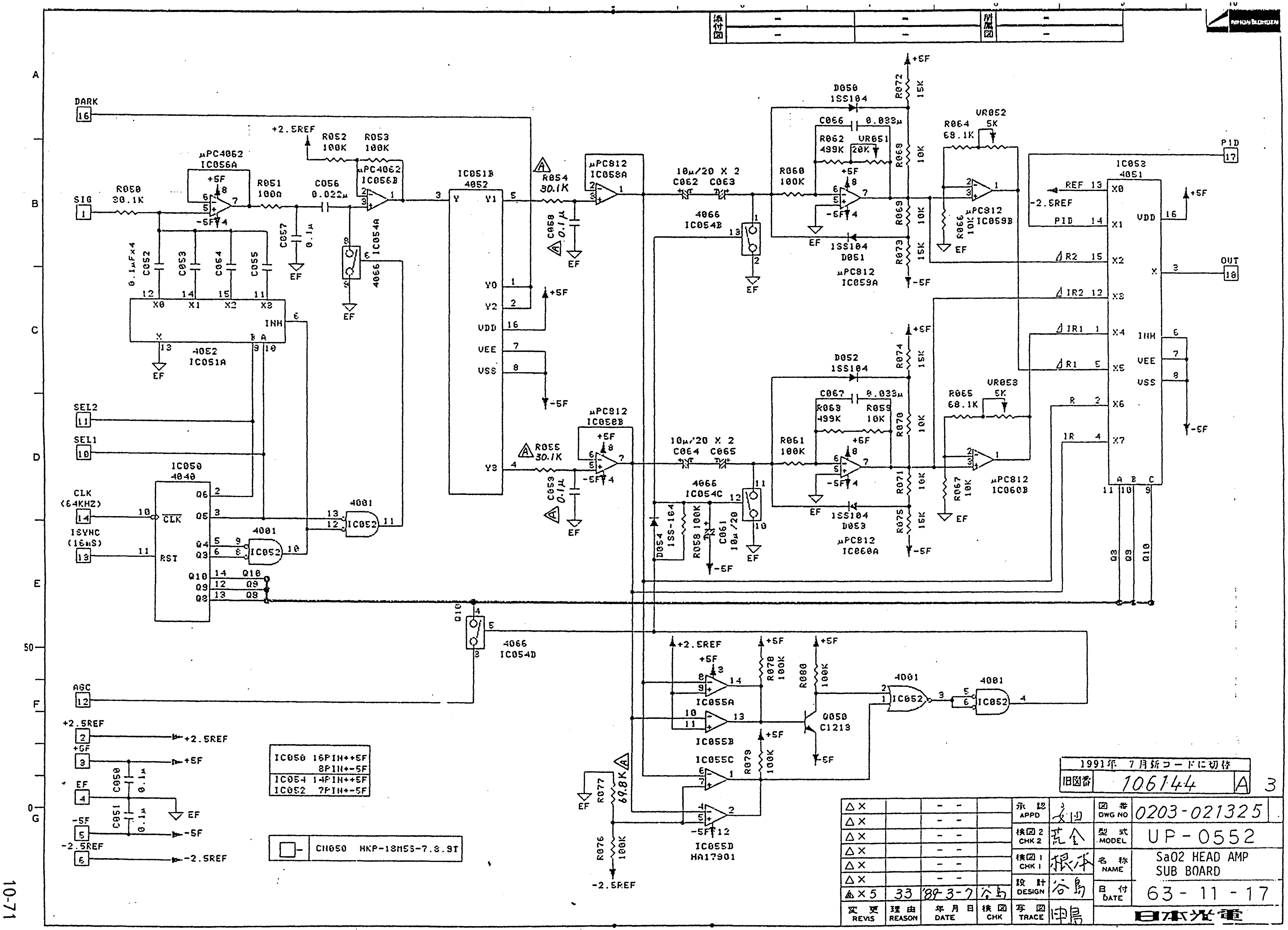
3

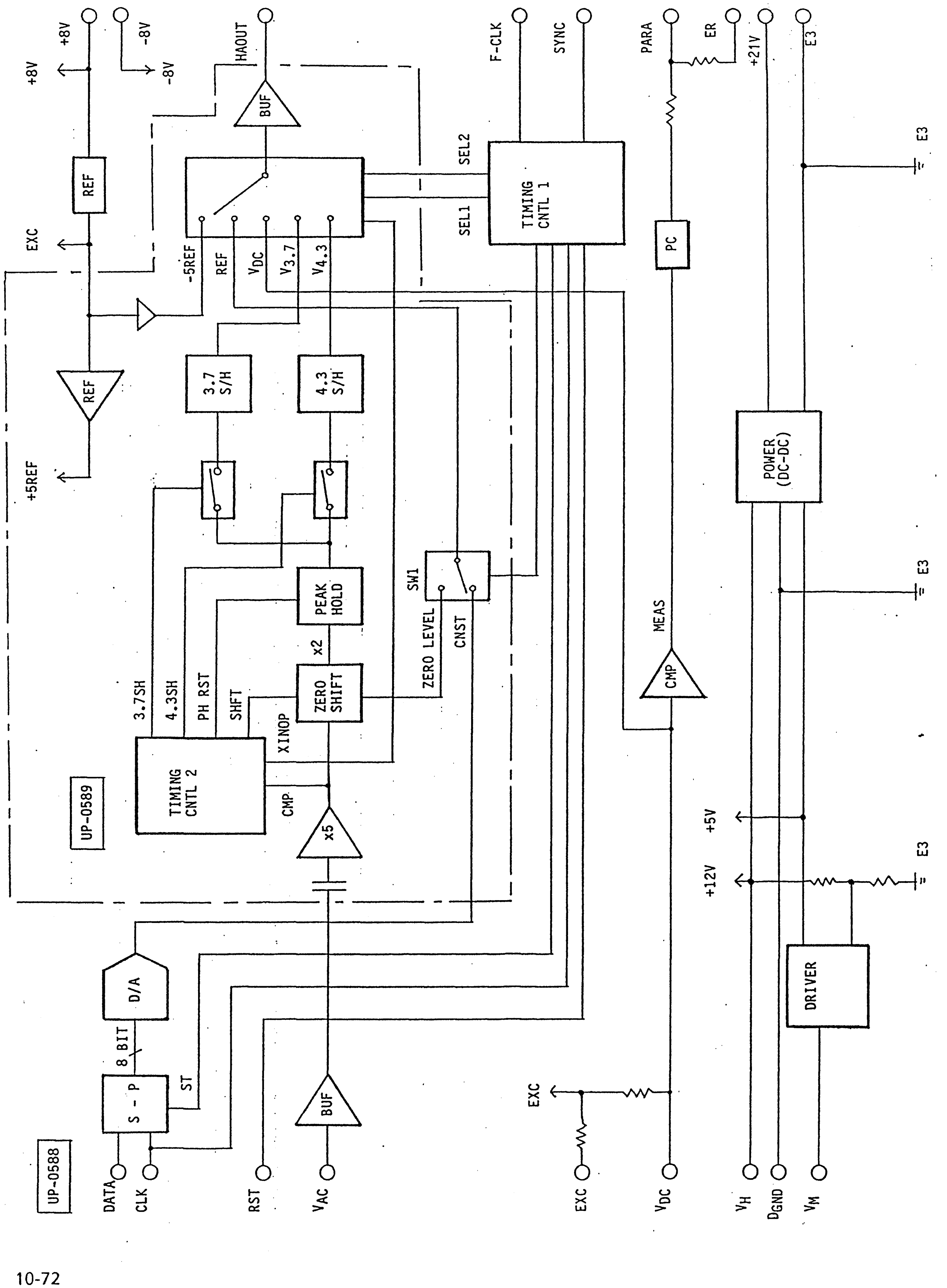
△×		– –		承認 APPO	太田	図番 DWG NO	105842
△×		– –		検図2 CHK 2	荒金	型式 MODEL	JE-001P
△×		– –		検図1 CHK 1	谷島	名称 NAME	EEG connection cable
△×		– –		設計 DESIGN	根本	日付 DATE	63- 3 -31
△×		– –					
△×		– –					
△×		– –					
変更 REVS	理由 REASON	年月日 DATE	検図 CHK	写図 TRACE		日本光電	

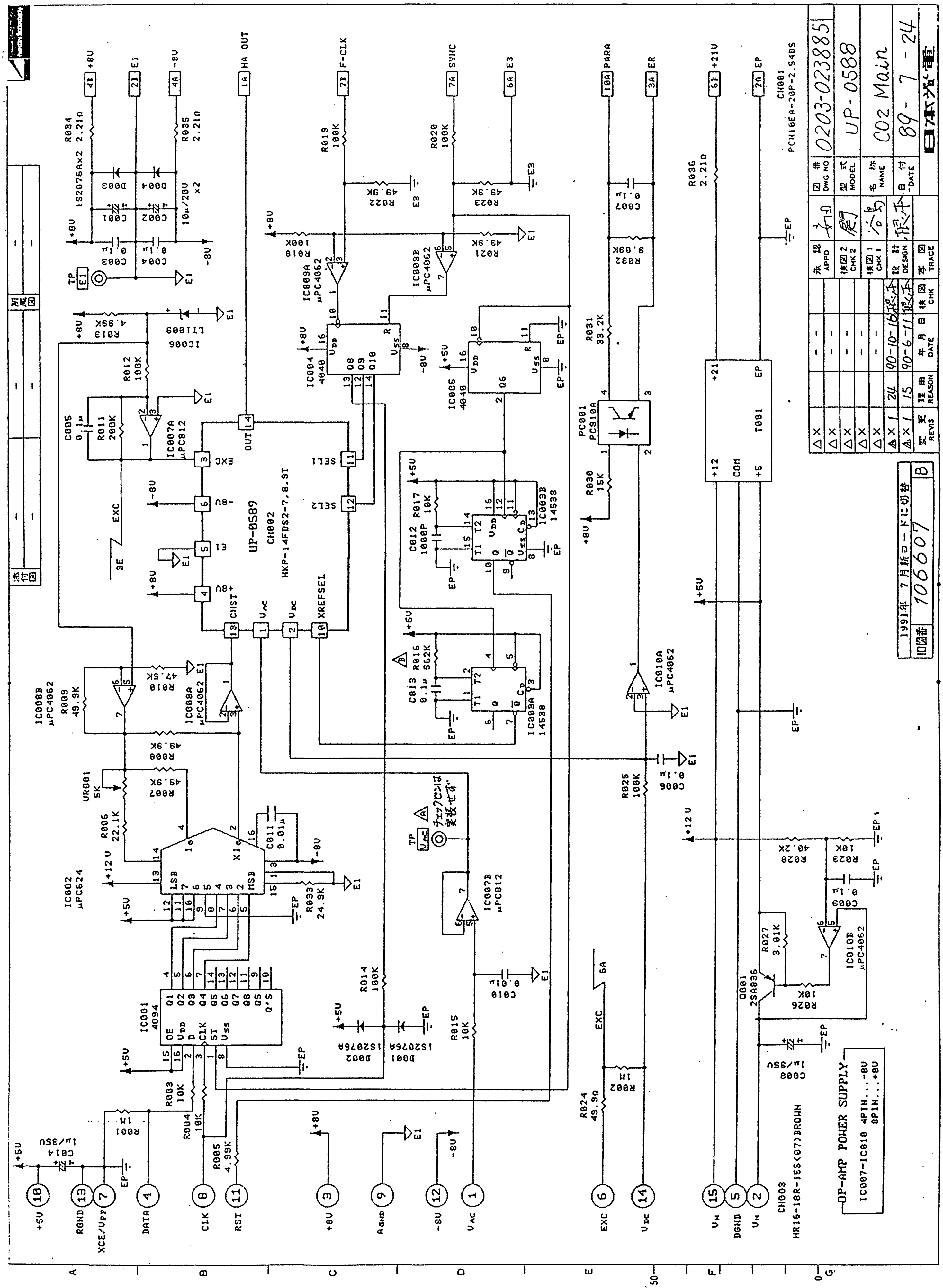

1991年 7月新コードに切替
旧図番 106049 B
3
DWG NO 0203-021209
MODEL UP-0548
NAME RESPIRATION HEAD AMPLIFIER
DATE 63-10-07
APPD
CHK 2
CHK 1
DESIGN
TRACE
REVIS
REASON
DATE
CHK
33
89-9-1
13
89-3-14
PCN10EA-20P-2.54DS
CN001
F-CLK 7B
+15V 5B
E3 6A
+8V 4B
-8V 4A
HAOUT 1A
EH 3B
E3 2A
PARA 10A
ER 3A
ISOLATE IC004
R001 10K
C012 0.01μ
C009 0.1μ
R003 1.5K
R002 8.06K
Q001 2SC1213
Q002 2SC1213
D005
D006
T001 EP10PS (GREEN)
T002 EP101S (YELLOW)
GA001 Y08-2100B
PC810A PC001
D001-D008 1S2076A × 8
C001
C002
10μF/20V ×2
IC008A 4953
IC008B 4953
R016 10K
IC001 78L05
IC002 79L05
R008 49.9K
R007 49.9K
R023 49.9Ω
C011 0.01μ
D003
D004
C003 1μF/35V
C004 1μF/35V
R019 15K
R021 4.99K
R022 4.99K
R020 15K
FLOATING AREA
TP EF
CN003 M60-04
IC003 LT1009
R005 2K
C005 10μF/20V
1SS104 D007
1SS104 D008
IC007A μPC4062
IC007B μPC4062
R018 100K
R011 100K
VR001 10K
IC005 μPC811
0.033μ
C010
R017 499K
R015 20K
R012 100K
R013 402K
R014 1.5M
C008 1μ
C007 0.033μ
R010 301K
R009 24.9K
IC006A μPC812
IC006B μPC812
C006 0.47μ
R006 100K
R004 49.9K
R024 40.2K
R025 30.1K
CN002 LGY-6501
IC008 16 Pin +5F
3.4.5.6.7.8.9 Pin -5F
IC005 7 Pin +5F
4 Pin -5F
+5F
-5F
+2.5F
EF
A
B
C
D
E
F
G
50
0

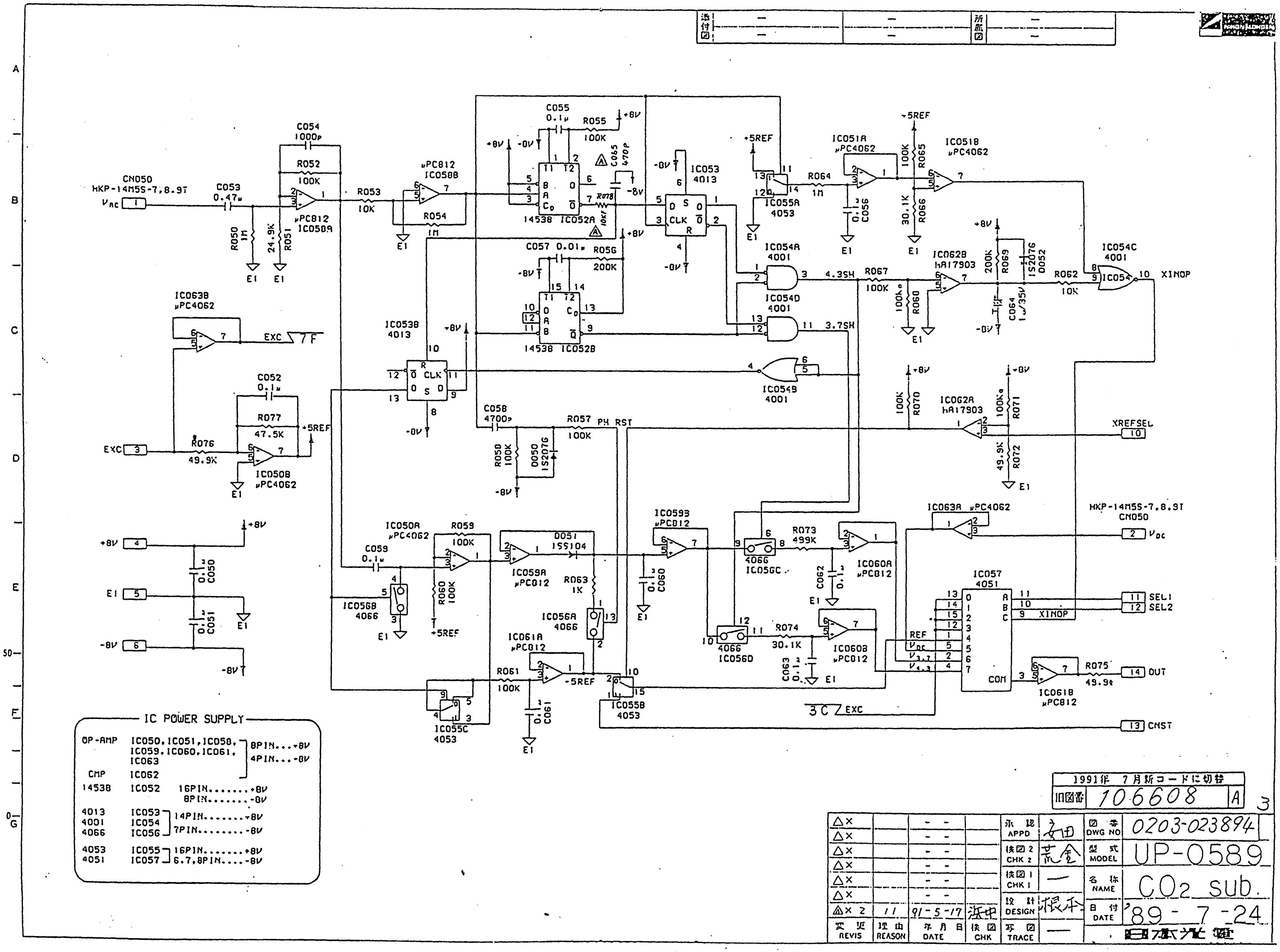

FCLK
HAOUT
PARA (0.9V)
ER
SYNC
HYBRID ISOLATE
(16ms)
PC
EF
SWITCH-ING
CLK
+9VU
REGULATOR
+5F
-5F
REF
+2.5REF
8CH MPX
OUT
0
1
2
3
4
5
6
7
REF
PID
R2
IR2
IR1
R1
R
IR
x8
x8
-2.5REF
TIMING CONTROL
x5 AUTO INST
x5 AUTO INST
AUTO GAIN CONTROL
10Hz S-H
10Hz S-H
UP-0552 Sub board
MPX
10Hz + BASE HOLD
UP-0551 Main board
S-H
AUTO GAIN
LED CNTL
AMP
AMP
-2.5REF
+9FU
20mA
40mA 1/4 DUTY
40mA 1/4 DUTY
PROBE ID
Sa02 PROBE


1991年 7月
106143
A
3
0203-021316
UP-0551
SaO2 HEAD AMP
MAIN BOARD
63-11-17
89-9-1
FLOATING AREA
CN001 PCN10EA-20P-2.54DS
ISOLATE IC005
UP-0552
CN003 HKP-18FDS2-7.8.9T
CN002 HR16-18R-10S(05)
IC006 4051
IC007 4040
IC008 4052
IC001 78L05
IC002 79L05
IC004 LT1009
IC003A 4053
IC009A μPC812
IC009B μPC812
IC010A μPC4062
IC010B μPC4062
IC011A μPC812
IC011B μPC812
PC810A PC001
T001 EP10PS
T002 EP10IS
D001-D006 1S2076A x6
F-CLK
+15V
E3
+8V
-8V
H-OUT
EH
PARA
ER
SYNC
SHIELD
+5F
-5F
+2.5REF
-2.5REF
EF
SIG
AGC
SEL1
SEL2
CLK
OUT
ISYNC
DARK
PID


DARK 16
SIG 1
R050 30.1K
μPC4062 IC056A
R051 100Ω
C056 0.022μ
C057 0.1μ
+2.5REF
R052 100K
R053 100K
μPC4062 IC056B
4066 IC054A
0.1μFx4 C052 C053 C054 C055
4052 IC051A
X0 X1 X2 X3 INH X B A
EF
IC051B 4052
Y Y1 Y0 Y2 VDD VEE VSS Y3
+5F
-5F
R054 30.1K
C058 0.1μ
R055 30.1K
C059 0.1μ
μPC812 IC058A
μPC812 IC058B
10μ/20 X 2 C062 C063
10μ/20 X 2 C064 C065
4066 IC054B
4066 IC054C
4066 IC054D
D054 1SS-164
R058 100K
C061 10μ/20
R060 100K
R061 100K
D050 1SS104
D051 1SS104
D052 1SS104
D053 1SS104
C066 0.033μ
C067 0.033μ
R062 499K
VR051 20K
R063 499K
R059 10K
μPC812 IC059A
μPC812 IC060A
R072 15K
R069 10K
R073 15K
R074 15K
R070 10K
R071 10K
R075 15K
R064 68.1K
VR052 5K
R066 10K
μPC812 IC059B
R065 68.1K
VR053 5K
R067 10K
μPC812 IC060B
IC053 4051
REF 13
-2.5REF
PID 14
ΔR2 15
ΔIR2 12
ΔIR1 1
ΔR1 5
R 2
IR 4
X0 X1 X2 X3 X4 X5 X6 X7
VDD 16
X 3
INH 6
VEE 7
VSS 8
A B C
PID 17
OUT 18
SEL2 11
SEL1 10
CLK (64KHZ) 14
ISYNC (16mS) 13
IC050 4040
CLK RST Q6 Q5 Q4 Q3 Q10 Q9 Q8
4001 IC052
Q10 Q9 Q8
AGC 12
+2.5REF 2
+5F 3
EF 4
-5F 5
-2.5REF 6
C050 0.1μ
C051 0.1μ
IC050 16PIN→+5F
8PIN→-5F
IC054 14PIN→+5F
IC052 7PIN→-5F
CN050 HKP-18MSS-7.8.9T
IC055A
IC055B
IC055C
IC055D HA17901
R078 100K
R080 100K
R079 100K
Q050 C1213
R077 69.8K
R076 100K
4001 IC052
添付図
附属図
1991年 7月新コードに切替
旧図番 106144 A 3
承認 APPD
検図2 CHK2
検図1 CHK1
設計 DESIGN
写図 TRACE
図番 DWG NO 0203-021325
型式 MODEL UP-0552
名称 NAME Sa02 HEAD AMP SUB BOARD
日付 DATE 63-11-17
ΔX5 33 '89-3-7
変更 REVIS
理由 REASON
年月日 DATE
検図 CHK
日本光電


UP-0589
UP-0588
+8V
+8V
-8V
-8V
REF
EXC
REF
+5REF
HAOUT
BUF
-5REF
REF
V_{DC}
$V_{3.7}$
$V_{4.3}$
3.7 S/H
4.3 S/H
PEAK HOLD
ZERO SHIFT
x2
x5
CMP
XINOP
3.7SH
4.3SH
PH RST
SHFT
TIMING CNTL 2
SW1
ZERO LEVEL
CNST
SEL2
SEL1
TIMING CNTL 1
F-CLK
SYNC
PARA
ER
PC
MEAS
CMP
+21V
E3
E3
E3
E3
POWER (DC-DC)
+5V
+12V
DRIVER
D/A
8 BIT
S - P
ST
BUF
EXC
DATA
CLK
RST
V_{AC}
EXC
V_{DC}
V_H
D_{GND}
V_M


0203-023885
UP-0588
CO2 Main
89-7-24
図番 DWG NO
型式 MODEL
名称 NAME
日付 DATE
承認 APPD
検図2 CHK 2
検図1 CHK 1
設計 DESIGN
写図 TRACE
変更 REVIS
理由 REASON
年月日 DATE
検図 CHK
△× 1 24 90-10-16
△× 1 15 90-6-11
1991年 7月新コードに切替
旧図番 106607 B
UP-0589
CN002
HKP-14FDS2-7.8.9T
CN001
PCN10EA-20P-2.54DS
CN003
HR16-18R-15S(07)BROWN
OP-AMP POWER SUPPLY
IC007~IC010 4PIN...-8V
8PIN...+8V
IC001 4094
IC002 μPC624
IC003A 14538
IC003B 14538
IC004 4040
IC005 4040
IC006 LT1009
IC007A μPC812
IC007B μPC812
IC008A μPC4062
IC008B μPC4062
IC009A μPC4062
IC009B μPC4062
IC010A μPC4062
IC010B μPC4062
PC001 PC910A
T001
Q001 2SA836
D001 1S2076A
D002 1S2076A
D003
D004
1S2076Ax2
C001
C002
10μ/20V x2
C003 0.1μ
C004 0.1μ
C005 0.1μ
C006 0.1μ
C007 0.1μ
C008 1μ/35V
C009 0.1μ
C010 0.01μ
C011 0.01μ
C012 1000P
C013 0.1μ
C014 1μ/35V
R001 1M
R002 1M
R003 10K
R004 10K
R005 4.99K
R006 22.1K
R007 49.9K
R008 49.9K
R009 49.9K
R010 47.5K
R011 200K
R012 100K
R013 4.99K
R014 100K
R015 10K
R016 562K
R017 10K
R018 100K
R019 100K
R020 100K
R021 49.9K
R022 49.9K
R023 49.9K
R023 10K
R024 49.9Ω
R025 100K
R026 10K
R027 3.01K
R028 40.2K
R030 15K
R031 33.2K
R032 9.09K
R033 24.9K
R034 2.21Ω
R035 2.21Ω
R036 2.21Ω
VR001 5K
TP E1
TP VAC
チェックピンは実装せず
+5V 10
RGND 13
XCE/VPP 7
DATA 4
CLK 8
RST 11
+8V 3
AGND 9
-8V 12
VAC 1
EXC 6
VDC 14
VH 15
DGND 5
VH 2
4B +8V
2B E1
4A -8V
1A HA OUT
7B F-CLK
7A SYNC
6A E3
10A PARA
3A ER
6B +21V
2A EP
CHST 13
VAC 1
VDC 2
XREFSEL 10
+8V 4
E1 5
-8V 6
EXC 3
OUT 14
SEL1 11
SEL2 12
3E
EXC
6A
+21
COM
+12
EP
+5
+12V
+5V
+8V
-8V
E1
E3
EP
LSB
MSB
Io
XIo
Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 QS Q'S
OE VDD D CLK ST VSS
Q8 Q9 Q10
Q6
VDD VSS R
T1 T2 Q Q̄ CD VSS VDD
A B C D E F G
50



CN050
HKP-14M5S-7,8,9T
V_RC 1
C053 0.47μ
R050 1M
R051 24.9K
E1
C054 1000p
R052 100K
μPC812 IC050A
R053 10K
μPC812 IC058B
R054 1M
IC063B μPC4062
EXC 7F
C052 0.1μ
R077 47.5K
+5REF
EXC 3
R076 49.9K
IC050B μPC4062
+8V 4
C050 0.1
E1 5
C051 0.1
-8V 6
C055 0.1μ
R055 100K
+8V
-8V
C065 470p
R078 10K
14538 IC052A
C057 0.01μ
R056 200K
14538 IC052B
IC053B 4013
IC053 4013
C058 4700p
R058 100K
D050 1S2076
R057 100K
PH RST
+5REF
IC055A 4053
R064 1M
C056 0.1
IC051A μPC4062
R065 100K
-5REF
R066 30.1K
IC051B μPC4062
IC054A 4001
IC054D 4001
4.3SH
3.7SH
IC054B 4001
R067 100K
R068 100K
IC062B hA17903
R069 200K
D052 1S2076
C064 1μ/35V
R062 10K
IC054C 4001
XINOP
R070 100K
R071 100K
IC062A hA17903
R072 49.9K
XREFSEL 10
IC050A μPC4062
C059 0.1μ
R059 100K
R060 100K
IC056B 4066
IC059A μPC812
D051 1SS104
R063 1K
IC056A 4066
IC061A μPC812
R061 100K
C061 0.1
IC055C 4053
IC055B 4053
IC059B μPC812
C060 0.1
4066 IC056C
R073 499K
C062 0.1
IC060A μPC812
4066 IC056D
R074 30.1K
C063 0.1
IC060B μPC812
IC063A μPC4062
HKP-14M5S-7,8,9T CN050
2 V_DC
IC057 4051
REF
V_DC
V_3.7
V_4.3
COM
11 SEL1
12 SEL2
XINOP
IC061B μPC812
R075 49.9
14 OUT
3C EXC
13 CNST
A
B
C
D
E
F
G
50
0

IC POWER SUPPLY

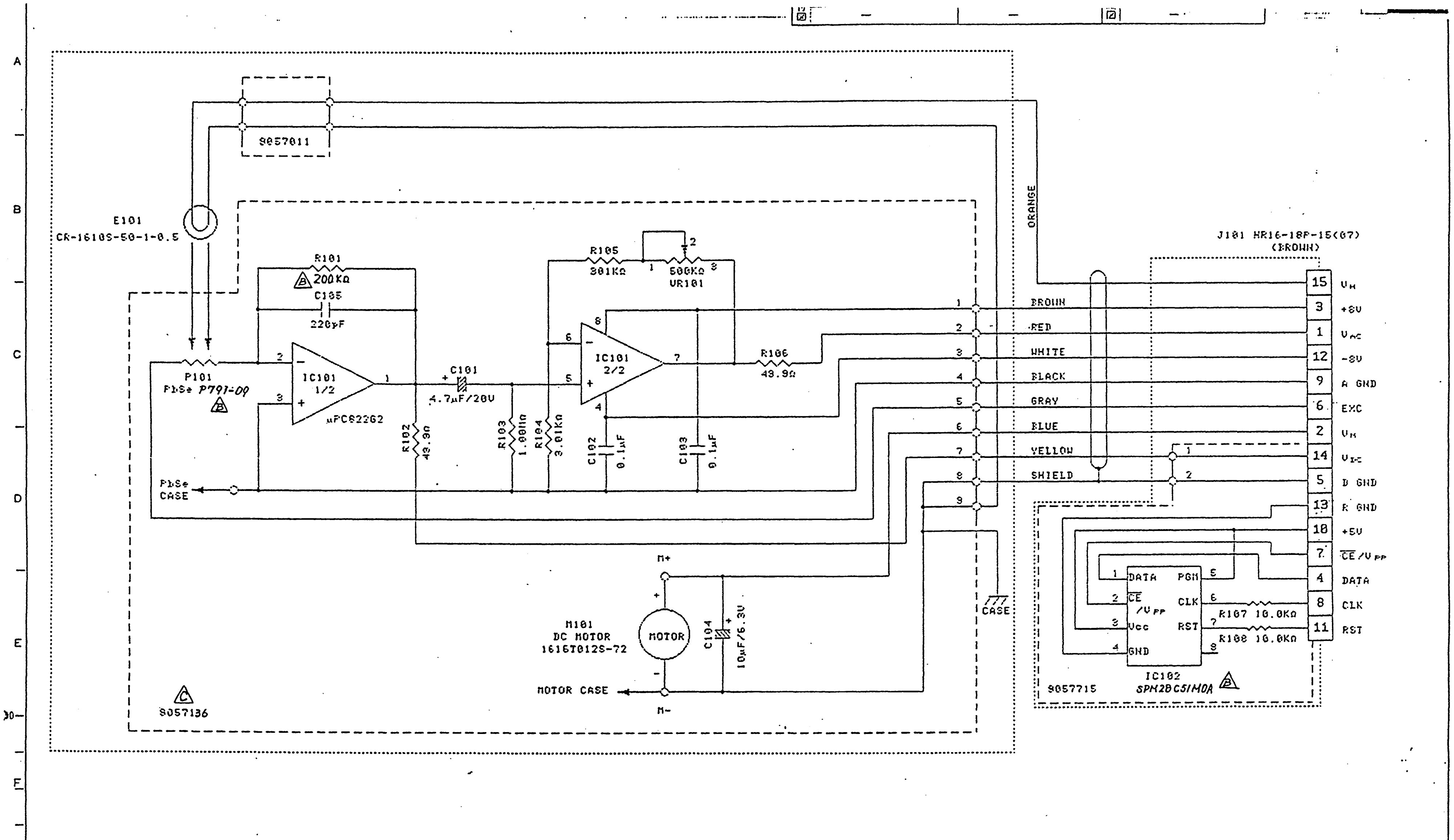
OP-AMP	IC050, IC051, IC058, IC059, IC060, IC061, IC063	8PIN...+8V 4PIN...-8V
CMP	IC062	
14538	IC052	16PIN.......+8V 8PIN.......-8V
4013 4001 4066	IC053 IC054 IC056	14PIN.......+8V 7PIN.......-8V
4053 4051	IC055 IC057	16PIN.......+8V 6,7,8PIN....-8V

添付図	—	—	—
所属図	—	—	

1991年 7月新コードに切替
旧図番 106608 A 3

変更 REVIS	理由 REASON	年月日 DATE	検図 CHK
△×	-	-	
△×	-	-	
△×	-	-	
△×	-	-	
△×	-	-	
△×	-	-	
⚠× 2	/ /	91-5-17	浜中

承認 APPD	安田	図番 DWG NO	0203-023894
検図2 CHK 2	荒金	型式 MODEL	UP-0589
検図1 CHK 1	—	名称 NAME	CO₂ sub.
設計 DESIGN	根本	日付 DATE	'89-7-24
写図 TRACE	—		日本光電


A
B
C
D
E
F
G
E101
CR-1610S-50-1-0.5
9057011
ORANGE
R101
200KΩ
C105
220pF
P101
PbSe P791-09
IC101
1/2
μPC8226C
PbSe CASE
C101
4.7μF/20V
R102
43.9Ω
R103
1.00MΩ
R104
3.01KΩ
R105
301KΩ
500KΩ
VR101
IC101
2/2
C102
0.1μF
C103
0.1μF
R106
43.9Ω
M+
M-
M101
DC MOTOR
1616T012S-72
MOTOR
C104
10μF/6.3V
MOTOR CASE
9057136
CASE
BROWN
RED
WHITE
BLACK
GRAY
BLUE
YELLOW
SHIELD
J101 HR16-18P-15(07)
(BROWN)
VH
+8V
VAC
-8V
A GND
EXC
VH
VDC
D GND
R GND
+5V
CE/VPP
DATA
CLK
RST
DATA
CE /VPP
Vcc
GND
PGM
CLK
RST
R107 10.0KΩ
R108 10.0KΩ
IC102
SPM28C51M0A
9057715

1991年 7月新コードに切替		
旧図番	106772	C

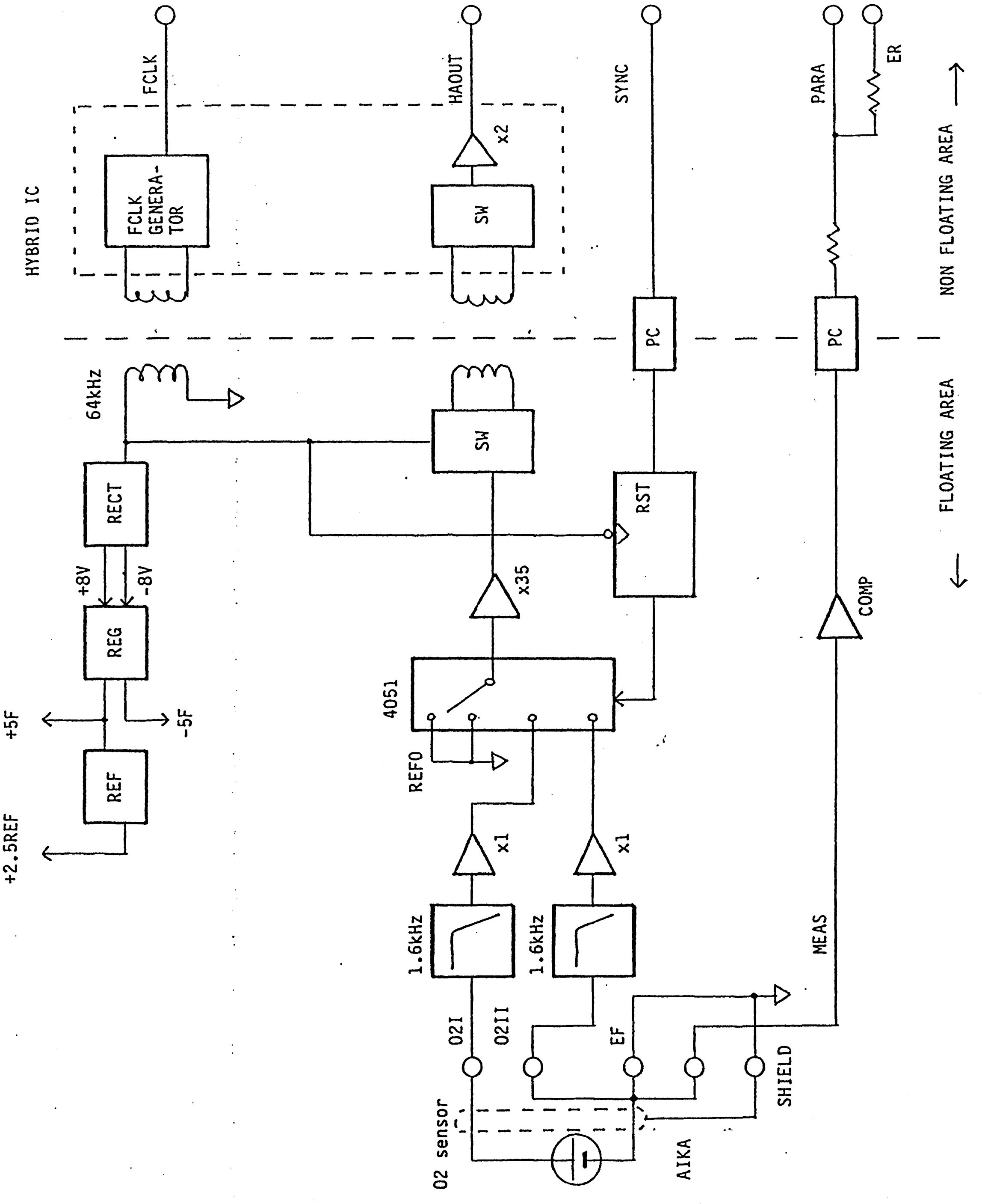
4

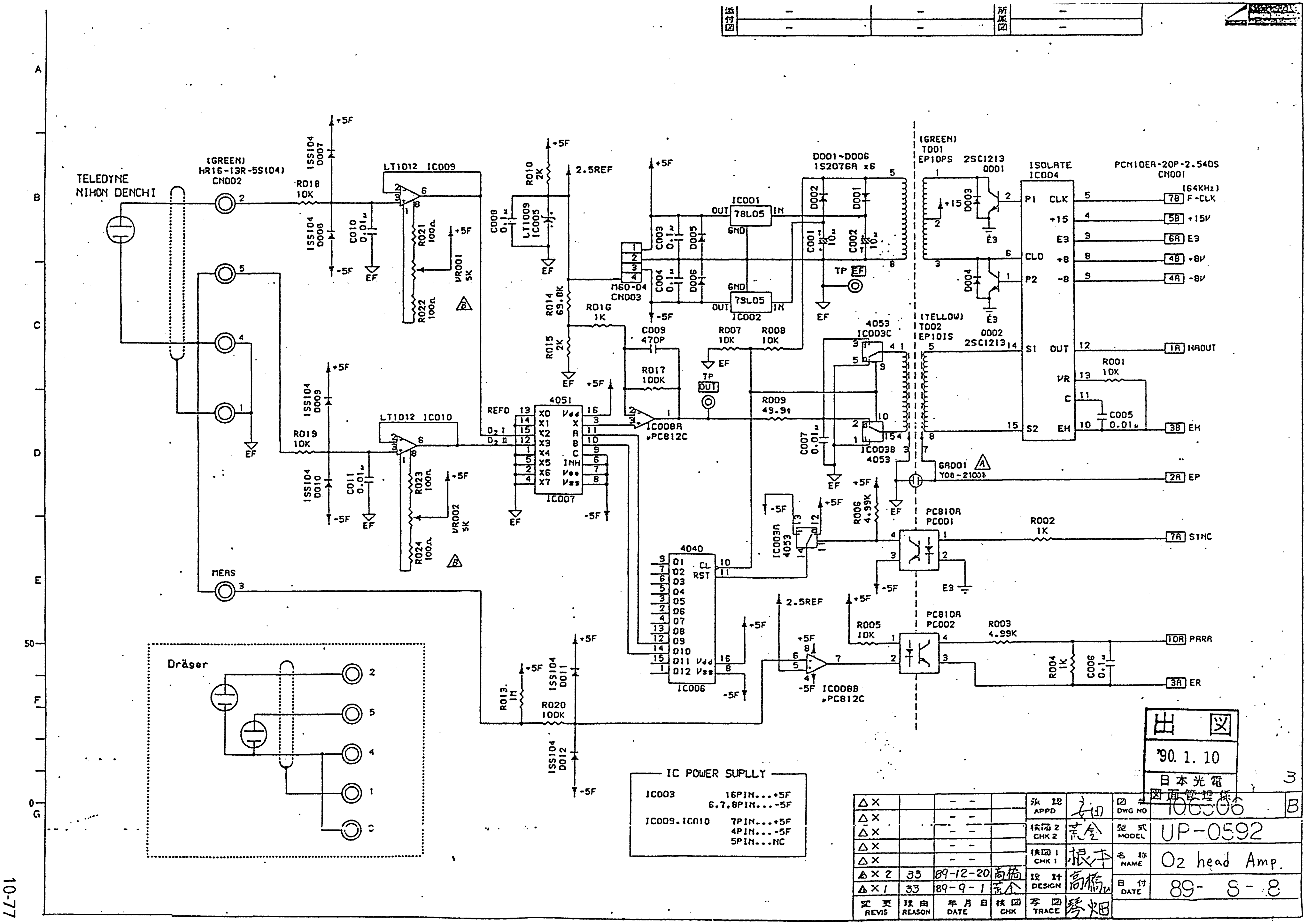
△×		- -	
△×		- -	
△×		- -	
△×		- -	
△×1	32	90-9-25	鈴木
△×3	33	90-4-18	鈴木
△×1	11	90-4-17	鈴木
変更 REVIS	理由 REASON	年月日 DATE	検図 CHK

承認 APPD	和田
検図2 CHK 2	梅尾
検図1 CHK 1	倉橋
設計 DESIGN	栗田
写図 TRACE	栗田

図番 DWG NO	0203-025081
型式 MODEL	TG-706P
名称 NAME	CO2 Sensor
日付 DATE	1 - 7 - 24

日本光電


HYBRID IC
FCLK
FCLK GENERA-TOR
HAOUT
x2
SW
SYNC
PARA
ER
NON FLOATING AREA
FLOATING AREA
PC
PC
64kHz
RECT
+8V
-8V
REG
+5F
-5F
REF
+2.5REF
SW
RST
x35
4051
REFO
x1
x1
1.6kHz
1.6kHz
COMP
MEAS
O2I
O2II
EF
SHIELD
O2 sensor
AIKA


TELEDYNE
NIHON DENCHI
(GREEN) HR16-13R-5S(04) CN002
MEAS
Dräger
R018 10K
R019 10K
1SS104 D007
1SS104 D008
1SS104 D009
1SS104 D010
C010 0.01u
C011 0.01u
LT1012 IC009
LT1012 IC010
R021 100Ω
R022 100Ω
R023 100Ω
R024 100Ω
VR001 5K
VR002 5K
R010 2K
LT1009 IC005
C008 0.1u
2.5REF
R014 69.8K
R015 2K
R016 1K
M60-04 CN003
C003 0.1u
C004 0.1u
D005
D006
IC001 78L05
IC002 79L05
D001~D006 1S2076A x6
C001 10u
C002 10u
TP EF
C009 470P
R017 100K
R007 10K
R008 10K
TP OUT
R009 49.9Ω
IC008A μPC812C
IC008B μPC812C
4051 IC007
REFO
O2 I
O2 II
4040 IC006
4053 IC003A
4053 IC003B
4053 IC003C
C007 0.01u
R006 4.99K
(GREEN) T001 EP10PS
(YELLOW) T002 EP101S
2SC1213 Q001
2SC1213 Q002
D003
D004
GA001 Y08-2100B
ISOLATE IC004
PCN10EA-20P-2.54DS CN001
(64KHz) 7B F-CLK
5B +15V
6A E3
4B +8V
4A -8V
1A HAOUT
3B EH
2A EP
7A SYNC
10A PARA
3A ER
R001 10K
C005 0.01u
PC810A PC001
PC810A PC002
R002 1K
R003 4.99K
R004 1K
R005 10K
C006 0.1u
R013 1M
R020 100K
1SS104 D011
1SS104 D012
+5F
-5F
EF
E3
IC POWER SUPLLY
IC003 16PIN...+5F
6,7,8PIN...-5F
IC009, IC010 7PIN...+5F
4PIN...-5F
5PIN...NC
出図
'90. 1. 10
日本光電
図面管理係
3
図番 DWG NO 106506 B
型式 MODEL UP-0592
名称 NAME O2 head Amp.
日付 DATE 89- 8- 8
承認 APPD
検図2 CHK 2
検図1 CHK 1
設計 DESIGN 高橋
写図 TRACE
△X2 33 89-12-20 高橋
△X1 33 89-9-1
変更 REVIS
理由 REASON
年月日 DATE
検図 CHK
添付図
所属図

Nihon Kohden Corporation
Head Office
31-4, Nishiochiai 1-chome, Shinjuku-ku,
Tokyo 161-8560, Japan

International Division Sales Department
Tokyo (Head Office)
Telephone: 81(3)5996-8036
Facsimile: 81(3)5996-8100

Nihon Kohden Singapore PTE LTD
70 Shenton Way, #14-05 Marina House
SINGAPORE 079118
Telephone: 224-6700
Facsimile: 224-6216

Nihon Kohden China Service Centers

上海维修站
上海市徐汇区南丹路169号 新旺大厦3008室
电话：021-6438-2268 传真：021-6469-9016

北京维修站
北京市复兴路61号 恒信商务大厦西207室
电话：010-6827-3967 传真：010-6827-6576

广州维修站
广州市沿江中路195～197号 沿江大厦712室
电话：020-8333-3949 传真：020-8333-3958

沈阳维修站
沈阳市和平区常德街59号4楼
电话／传真：024-387-3072

成都维修站
成都市一环路西二段25号 华立大厦420室
电话：028-773-6236

Nihon Kohden America, Inc.
2601 Campus Drive, Irvine, CA 92612, U.S.A.
Telephone: (949)250-3959
Facsimile: (949)250-3210

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The model and serial number of your instrument are identified on the rear or bottom of the unit. Write the model and serial number in the spaces provided below. Whenever you call your distributor concerning this instrument, these two pieces of information should be mentioned for quick and accurate service.

Model________________________ Serial Number ______________________

YOUR DISTRIBUTOR

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